

Associations between respiratory health and ozone and fine particulate matter during a wildfire event

www.nrfirescience.org/resource/20034

Wildfires have been increasing in frequency in the western United States (US) with the 2017 and 2018 fire seasons experiencing some of the worst wildfires in terms of suppression costs and air pollution that the western US has seen. Although growing evidence suggests respiratory exacerbations from elevated fine particulate matter (...)

Author(s): Colleen Reid, Ellen M. Considine, Gregory L. Watson, Donatello Telesca, Gabriele G. Pfister, Michael Jerrett

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Assessing relative differences in smoke exposure from prescribed, managed, and full suppression wildland fire

www.nrfirescience.org/resource/19522

A novel approach is presented to analyze smoke exposure and provide a metric to quantify health-related impacts. Our results support the current understanding that managing low-intensity fire for ecological benefit reduces exposure when compared to a high-intensity full suppression fire in the Sierra Nevada of California. More...

Author(s): D.W. Schweizer, Haiganoush K. Preisler, Ricardo Cisneros

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Estimating fire smoke related health burden and novel tools to manage impacts on urban populations - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/19727

Fire smoke is a major contributor to both particulate matter (PM) and ozone exposure in urban centers. Epidemiological, clinical, and toxicological studies have demonstrated a casual relationship between these pollutants and cardiovascular and respiratory related deaths and illnesses. Given the expected increase in fire events due...

Author(s): Brian J. Reich, Ana G. Rappold, Fay H. Johnston, Geoffrey G. Morgan, Neal L. Fann, Martin E. Cope, Richard A. Broome

Year Published: 2019

Type: Document

Technical Report or White Paper

Wildland firefighter smoke exposure and risk of lung cancer and cardiovascular disease mortality

www.nrfirescience.org/resource/19471

Wildland firefighters are exposed to wood smoke, which contains hazardous air pollutants, by suppressing thousands of wildfires across the U. S. each year. We estimated the relative risk of lung cancer and cardiovascular disease mortality from existing PM_{2.5} exposure-response relationships using measured PM₄ concentrations from...

Author(s): Kathleen M. Navarro, Michael T. Kleinman, Chris E. Mackay, Timothy E. Reinhardt, John R. Balmes, George A. Broyles, Roger D. Ottmar, Luke P. Naher, Joseph W. Domitrovich

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Contribution of wildland-fire smoke to US PM2.5 and its influence on recent trends

www.nrfirescience.org/resource/19113

Seasonal-mean concentrations of particulate matter with diameters smaller than 2.5 µm (PM2.5) have been decreasing across the United States (US) for several decades, with large reductions in spring and summer in the eastern US. In contrast, summertime-mean PM2.5 in the western US has not significantly decreased. Wildfires, a large...

Author(s): Katelyn O'Dell, Bonne Ford, Emily V. Fischer, Jeffrey R. Pierce

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Extensible Database of Validated Biomass Smoke Events for Health Research

www.nrfirescience.org/resource/18812

The extensible Biomass Smoke Validated Events Database is an ongoing, community driven, collection of air pollution events which are known to be caused by vegetation fires such as bushfires (also known as wildfire and wildland fires), or prescribed fuel reduction burns, and wood heaters. This is useful for researchers of health...

Author(s): Ivan C. Hanigan, Geoffrey G. Morgan, Grant J. Williamson, Farhad Salimi, Sarah B. Henderson, Murray R. Turner, David M. J. S. Bowman, Fay H. Johnston

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Developing an online tool for identifying at-risk populations to wildfire smoke hazards

www.nrfirescience.org/resource/17263

Wildfire episodes pose a significant public health threat in the United States. Adverse health impacts associated with wildfires occur near the burn area as well as in places far downwind due to wildfire smoke exposures. Health effects associated with exposure to particulate matter arising from wildfires can range from mild eye and...

Author(s): Ambarish Vaidyanathan, Fuyuen Yip, Paul Garbe

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Wildland fire smoke and human health

www.nrfirescience.org/resource/16639

The natural cycle of landscape fire maintains the ecological health of the land, yet adverse health effects associated with exposure to emissions from wildfire produce public health and clinical challenges. Systematic reviews conclude that a positive association exists between exposure to wildfire smoke or wildfire particulate...

Author(s): Wayne E. Cascio

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

The role of composition and particle size on the toxicity of wildfire emissions - JFSP Final Report

www.nrfirescience.org/resource/18785

Acute and chronic exposure to wildfire smoke can cause numerous documented cardiopulmonary effects, although determining the casual components within the thousands of different chemicals found in both the particle and gas phases remains a toxicological challenge. Specifically, little work has been

done to evaluate and predict...
Author(s): M. Ian Gilmour
Year Published: 2018
Type: Document
Technical Report or White Paper

The health impacts and economic value of wildland fire episodes in the U.S.: 2008-2012

www.nrfirescience.org/resource/17239

Wildland fires degrade air quality and adversely affect human health. A growing body of epidemiology literature reports increased rates of emergency departments, hospital admissions and premature deaths from wildfire smoke exposure. Objective: Our research aimed to characterize excess mortality and morbidity events, and the economic...

Author(s): Neal L. Fann, Breanna Alman, Richard A. Broome, Geoffrey G. Morgan, Fay H. Johnston, George A. Pouliot, Ana G. Rappold
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Wildfire smoke exposure and human health: significant gaps in research for a growing public health issue

www.nrfirescience.org/resource/16286

Understanding the effect of wildfire smoke exposure on human health represents a unique interdisciplinary challenge to the scientific community. Population health studies indicate that wildfire smoke is a risk to human health and increases the healthcare burden of smoke-impacted areas. However, wildfire smoke composition is complex...

Author(s): Carolyn Black, Yohannes Tesfaigzi, Jed A. Bassein, Lisa A. Miller
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Application of an original wildfire smoke health cost benefits transfer protocol to the western US, 2005-2015

www.nrfirescience.org/resource/15529

Recent growth in the frequency and severity of US wildfires has led to more wildfire smoke and increased public exposure to harmful air pollutants. Populations exposed to wildfire smoke experience a variety of negative health impacts, imposing economic costs on society. However, few estimates of smoke health costs exist and none for...

Author(s): Benjamin A. Jones, Robert P. Berrens
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Smoke in a new era of fire

www.nrfirescience.org/resource/17804

Smoke from fire can sharply reduce air quality by releasing particulate matter, one of the most dangerous types of air pollution for human health. A third of U.S. households have someone sensitive to smoke. Minimizing the amount and impact of smoke is a high priority for land managers and regulators. One tool for achieving that goal...

Author(s): Rachel White, Paul F. Hessburg, Narasimhan K. Larkin, J. Morgan Varner
Year Published: 2017
Type: Document

Technical Report or White Paper

Aligning smoke management with ecological and public health goals

www.nrfirescience.org/resource/15053

Past and current forest management affects wildland fire smoke impacts on downwind human populations. However, mismatches between the scale of benefits and risks make it difficult to proactively manage wildland fires to promote both ecological and public health. Building on recent literature and advances in modeling smoke and health...

Author(s): Jonathan Long, Leland W. Tarnay, Malcolm P. North

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Accelerating awareness, understanding, and adoption of wildland fire science information - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17026

Smoke from wildland fires has a significant impact on public health and transportation safety and presents a serious complication for air regulators seeking to design effective and efficient emission control strategies to meet and maintain air quality standards. Wildland fires produce numerous hazardous air pollutants and criteria...

Author(s): Shawn P. Urbanski

Year Published: 2017

Type: Document

Technical Report or White Paper

Occupational Exposure to Polycyclic Aromatic Hydrocarbon of Wildland Firefighters at Prescribed and Wildland Fires

www.nrfirescience.org/resource/16419

Wildland firefighters suppressing wildland fires or conducting prescribed fires work long shifts during which they are exposed to high levels of wood smoke with no respiratory protection. Polycyclic aromatic hydrocarbons (PAHs) are hazardous air pollutants formed during incomplete combustion. Exposure to PAHs was measured for 21...

Author(s): Kathleen M. Navarro, Ricardo Cisneros, Elizabeth M. Noth, John R. Balmes, Katharine Hammond

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Public use of information about smoke emissions: application of the risk information seeking and processing (RISP) model

www.nrfirescience.org/resource/16281

In the last few decades, the number of people living in fire-prone ecosystems has increased, placing more people and private property at risk to future fire events. Substantial research has demonstrated consistent public support for the use of prescribed fires in fuel-reduction efforts; however, continuing public concern regarding...

Author(s): Kathleen M. Rose, Eric Toman, Christine Olsen

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Social media approaches to modeling wildfire smoke dispersion: spatiotemporal and social scientific investigations

www.nrfirescience.org/resource/15552

Wildfires have significant effects on human populations, economically, environmentally, and in terms of their general well-being. Smoke pollution, in particular, from either prescribed burns or uncontrolled wildfires, can have significant health impacts. Some estimates suggest that smoke dispersion from fire events may affect the...

Author(s): Sonya Sachdeva, Sarah M. McCaffrey, Dexter Locke

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Effectiveness of public health messaging and communication channels during smoke events: a rapid systematic review

www.nrfirescience.org/resource/15062

Exposure to smoke emitted from wildfire and planned burns (i.e., smoke events) has been associated with numerous negative health outcomes, including respiratory symptoms and conditions. This rapid review investigates recent evidence (post-2009) regarding the effectiveness of public health messaging during smoke events. The...

Author(s): Jennifer A. Fish, Micah D. J. Peters, Imogen Ramsey, Greg Sharplin, Nadia Corsini, Marion Eckert

Year Published: 2017

Type: Document

Book or Chapter or Journal Article, Synthesis

How smoke from fires can affect your health

www.nrfirescience.org/resource/17800

Smoke is made up of a complex mixture of gases and fine particles produced when wood and other organic materials burn. The biggest health threat from smoke is from fine particles. These microscopic particles can penetrate deep into your lungs. They can cause a range of health problems, from burning eyes and a runny nose to...

Year Published: 2017

Type: Document

Research Brief or Fact Sheet

A Low-Cost Sensor Network for Wildfire Smoke Detection and Monitoring - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17021

Wildfires and prescribed fires produce emissions that are harmful to human health. These health effects, however, are difficult to quantify, likely in part due to sparse data on exposure. The ability to measure fire emissions as they reach sensitive areas is critical to ensuring the protection of public health. Ground level...

Author(s): John Volckens, Scott Kelleher

Year Published: 2017

Type: Document

Technical Report or White Paper

Wildland firefighter exposure to hydrocarbons

www.nrfirescience.org/resource/16582

Wildland firefighters suppressing wildland fires or conducting prescribed fires work long shifts and are exposed to high levels of smoke with no respiratory protection. Inhalation of smoke is a safety concern

for wildland firefighters and can potentially impair their performance and cause short and long term health impacts.

Author(s): Kathleen M. Navarro, Stacey S. Frederick

Year Published: 2017

Type: Document

Research Brief or Fact Sheet

Air-quality impacts and intake fraction of PM_{2.5} during the 2013 Rim Megafire

www.nrfirescience.org/resource/19466

The 2013 Rim Fire was the third largest wildfire in California history and burned 257 314 acres in the Sierra Nevada Mountains. We evaluated air-quality impacts of PM_{2.5} from smoke from the Rim Fire on receptor areas in California and Nevada. We employed two approaches to examine the air-quality impacts: (1) an evaluation of PM_{2.5}...

Author(s): Kathleen M. Navarro, Ricardo Cisneros, Susan M. O'Neill, Narasimhan K. Larkin, Don Schweizer, John R. Balmes

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Smoke management photographic guide: a visual aid for communicating impacts

www.nrfirescience.org/resource/14538

Communicating emissions impacts to the public can sometimes be difficult because quantitatively conveying smoke concentrations is complicated. Regulators and land managers often refer to particulate-matter concentrations in micrograms per cubic meter, but this may not be intuitive or meaningful to everyone. The primary purpose of...

Author(s): Joshua C. Hyde, Jarod Blades, Troy E. Hall, Roger D. Ottmar, Alistair M. S. Smith

Year Published: 2016

Type: Document

Technical Report or White Paper

Forest fire policy: change conventional thinking of smoke management to prioritize long-term air quality and public health

www.nrfirescience.org/resource/14467

Wildland fire smoke is inevitable. Size and intensity of wildland fires are increasing in the western USA. Smoke-free skies and public exposure to wildland fire smoke have effectively been postponed through suppression. The historic policy of suppression has systematically both instilled a public expectation of a smoke-free...

Author(s): D.W. Schweizer, Richard Cisneros

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Characterizing large airtanker use in United States fire management

www.nrfirescience.org/resource/16152

The appropriate role of large airtankers (LATs) in federal fire suppression in the United States has been the source of much debate and discussion in recent years as the U.S. Forest Service (USFS) has faced impending decisions about how best to address an aging fleet of contracted aircraft. Questions of fleet efficiency are...

Author(s): Crystal S. Stonesifer, Matthew P. Thompson, David E. Calkin, Charles W. McHugh

Year Published: 2015

Type: Document

Verification of Spot Fire Weather Forecasts

www.nrfirescience.org/resource/15563

Software was developed to evaluate National Weather Service (NWS) spot forecasts. Fire management officials request spot forecasts from the NWS to provide detailed guidance as to atmospheric conditions in the vicinity of planned prescribed burns as well as wildfires that do not have incident meteorologists on site. A multi-year set...

Author(s): John D. Horel, Timothy J. Brown

Year Published: 2015

Type: Document

Technical Report or White Paper

Wildfire smoke and public health risk

www.nrfirescience.org/resource/13562

Wildfire activity is predicted to increase with global climate change, resulting in longer fire seasons and larger areas burned. The emissions from fires are highly variable owing to differences in fuel, burning conditions and other external environmental factors. The smoke that is generated can impact human populations spread over...

Author(s): Fabienne Reisen, Sandra M. Duran, Michael D. Flannigan, Catherine Elliott, Karen Rideout

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

A systematic review of the physical health impacts from non-occupational exposure to wildfire smoke

www.nrfirescience.org/resource/13262

Climate change is likely to increase the threat of wild fires, and little is known about how wild fires affect health in exposed communities. A better understanding of the impacts of the resulting air pollution has important public health implications for the present day and the future. Method: We performed a systematic search to...

Author(s): Jia C. Liu, Gavin Pereira, Sarah A. Uhl, Mercedes Bravo, Michelle L. Bell

Year Published: 2015

Type: Document

Synthesis

Future mega-fires and smoke impacts

www.nrfirescience.org/resource/15579

"Megafire" events, in which large high-intensity fires propagate over extended periods, can cause both immense damage to the local environment and catastrophic air quality impacts on cities and towns downwind. Increases in extreme events associated with climate change (e.g., droughts, heat waves) are projected to result in more...

Author(s): Narasimhan K. Larkin, John T. Abatzoglou, Donald McKenzie, Brian E. Potter, E. Ashley Steel, Brian J. Stocks

Year Published: 2015

Type: Document

Technical Report or White Paper

Communicating about smoke from wildland fire: challenges and opportunities for managers

www.nrfirescience.org/resource/12982

Wildland fire and associated management efforts are dominant topics in natural resource fields. Smoke from fires can be a nuisance and pose serious health risks and aggravate pre-existing health conditions. When it results in reduced visibility near roadways, smoke can also pose hazardous driving conditions and reduce the scenic...

Author(s): Christine Olsen, Danielle K. Mazzotta, Eric Toman, A. Paige Fischer

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Perverse incentives: the case of wildfire smoke regulation

www.nrfirescience.org/resource/14235

Wildfire is on the rise. The United States is witnessing a spectacular increase in acres lost to catastrophic wildfires, a phenomenon fed by the generally hotter and dryer conditions associated with climate change. In addition to losses in lives, property, and natural resources, wildfires contribute thousands of tons of air...

Author(s): Kirsten H. Engel

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Smoke management of wildland and prescribed fire: understanding public preferences and trade-offs

www.nrfirescience.org/resource/13012

Smoke from forest fires is a serious and increasing land management concern. However, a paucity of information exists that is specific to public perceptions of smoke. This study used conjoint analysis, a multivariate technique, to evaluate how four situational factors (i.e., smoke origin, smoke duration, health impact, and advanced...

Author(s): Jarod Blades, Steven R. Shook, Troy E. Hall

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Bridging natural resource communication boundaries: public perceptions of smoke from wildland fires and forest managers' perspectives of climate change science

www.nrfirescience.org/resource/13479

Land managers of the northern Rocky Mountains and south-central U.S. are challenged with numerous social and ecological changes, many of which are linked to climate change. The work presented here focuses on two important research gaps: 1) managers do not understand public opinions toward smoke from prescribed fires (a necessary...

Author(s): Jarod Blades

Year Published: 2013

Type: Document

Dissertation or Thesis

Public perceptions of smoke from wildfire, prescribed fire, and fire use

www.nrfirescience.org/resource/13483

Managers and policy-makers across broad disciplines and organizations are calling for a better understanding of public opinion on natural resource issues. One such issue is that of fire and its role in the management of our forests and rangelands. Public perceptions of fuel reduction techniques, with a particular emphasis on using...

Author(s): Stacey S. Frederick

Year Published: 2013
Type: Document
Dissertation or Thesis

Wildfire smoke and health impacts: a closer look at fire attributes and their marginal effects

www.nrfirescience.org/resource/12143

Existing studies on the economic impact of wildfire smoke have focused on single fire events or entire seasons without considering the marginal effect of daily fire progression on downwind communities. In addition, neither approach allows for an examination of the impact of even the most basic fire attributes, such as distance and...

Author(s): K. Moeltner, Man-Kuen Kim, E. Zhu, W. Yang

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Public perceptions and tolerance of smoke from wildland fire - draft

www.nrfirescience.org/resource/13699

Land managers and officials need to understand the diverse public opinions toward smoke from wildland fires; however, a very limited amount of research has been conducted on this topic. Hence, land and fire managers are largely uncertain about society's willingness to tolerate smoke in the short-term for long-term benefits, and they...

Author(s): Jarod Blades, Troy E. Hall, Sarah M. McCaffrey

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Influencing public perceptions of smoke management and prescribed burning programs: an analysis of opportunities existing in communication tactics, community-based partnerships and interagency decision making

www.nrfirescience.org/resource/13507

Historical fire suppression efforts have led to the alteration of forest structure and fuel conditions across the United States. Correspondingly, managers are now faced with higher fuel loads and denser vegetation as well as growing forest communities and wildland-urban interface. While managers recognize the ecological benefits of...

Author(s): Danielle K. Mazzotta

Year Published: 2012

Type: Document

Dissertation or Thesis

Research perspectives on the public and fire management: a synthesis of current social science on eight essential questions

www.nrfirescience.org/resource/12601

As part of a Joint Fire Science Program project, a team of social scientists reviewed existing fire social science literature to develop a targeted synthesis of scientific knowledge on the following questions: 1. What is the public's understanding of fire's role in the ecosystem? 2. Who are trusted sources of information about fire...

Author(s): Sarah M. McCaffrey, Christine Olsen

Year Published: 2012

Type: Document

Synthesis

Situational awareness: nighttime smoke and fog on prescribed burns

www.nrfirescience.org/resource/12440

Nighttime smoke dispersal from most prescribed fires is critical for public health and safety. For this reason, prescribed fire training and guidelines include detailed information about smoke management and remind burn managers to be constantly aware of weather, fuel, and other situations that might lead to smoke dispersion...

Author(s): Anthony Matthews, Vince Carver

Year Published: 2011

Type: Document

Research Brief or Fact Sheet

The economic cost of adverse health effects from wildfire: a review

www.nrfirescience.org/resource/14534

The economic costs of adverse health effects associated with exposure to wildfire smoke should be given serious consideration in determining the optimal wildfire management policy. Unfortunately, the literature in this research area is thin. In an effort to better understand the nature of these economic costs, we review and...

Author(s): Ikuho Kochi, Geoffrey H. Donovan, Patricia A. Champ, John B. Loomis

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Wildfire smoke: a guide for public health officials

www.nrfirescience.org/resource/12451

Smoke rolls into town, blanketing the city, turning on streetlights, creating an eerie and choking fog. Switchboards light up as people look for answers. Citizens want to know what they should do to protect themselves. School officials want to know if outdoor events should be cancelled. The news media want to know how dangerous the...

Author(s): Michael Lipsett, Barbara Materna, Susan Lyon Stone, Shannon Therriault, Robert Blaisdell, Jeff Cook

Year Published: 2008

Type: Document

Technical Report or White Paper

Real time monitoring of the three dimensional distribution of smoke aerosol levels from prescribed fires and wildfires - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11168

Particulates emitted by wildfires and prescribed fires can severely affect visibility and air quality resulting in car accidents, airport and road closures, and public health problems. Researchers have developed a new remote-sensing instrument (lidar) and are now calibrating and testing this and auxiliary instrumentation and new...

Author(s): Wei Min Hao, Vladimir A. Kovalev

Year Published: 2008

Type: Document

Technical Report or White Paper

Prescribed fire: what influences public approval?

www.nrfirescience.org/resource/8440

Except in remote areas, most prescribed fires will have some effect on members of the public. It is therefore important for land managers to work with the public before, during, and after a prescribed

burn. To do this effectively, managers need to have an accurate idea of what people do and do not think about prescribed fire and...

Author(s): Sarah M. McCaffrey

Year Published: 2006

Type: Document

Technical Report or White Paper

Using focus groups to involve citizens in resource management - investigating perceptions of smoke as a barrier to prescribed forest burning

www.nrfirescience.org/resource/11214

Participants in a series of focus groups discussed how their tolerance for smoke varied by the source of the smoke and found their opinions changing as they talked with other participants. Even those opposed to smoke from agricultural burning eventually found smoke from prescribed forest burning would be acceptable under appropriate...

Author(s): Brad R. Weisshaupt, Matthew S. Carroll, Keith A. Blatner, Pamela J. Jakes

Year Published: 2006

Type: Document

Technical Report or White Paper

Acceptability of smoke from prescribed forest burning in the northern inland west: a focus group approach

www.nrfirescience.org/resource/8393

Focus groups were used to gauge tolerance of smoke from broadcast prescribed forest burning in the wildland-urban interface of the northern Inland West. Focus group participants worked through issues surrounding prescribed burning as a management tool to determine if the origin of smoke made a difference in the acceptance of that...

Author(s): Brad R. Weisshaupt, Matthew S. Carroll, Keith A. Blatner, William D. Robinson, Pamela J. Jakes

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Federal Implementation Plans Under the Clean Air Act for Indian Reservations in Idaho, Oregon and Washington; Final Rule

www.nrfirescience.org/resource/12014

The Environmental Protection Agency (EPA) is taking final action on these Federal Implementation Plans (FIPs) under the Clean Air Act (CAA) for Indian reservations in Idaho, Oregon, and Washington. The FIPs put in place basic air quality regulations to protect health and welfare on Indian reservations located in the Pacific...

Author(s): U.S. Environmental Protection Agency

Year Published: 2005

Type: Document

Management or Planning Document

Smoke exposure at western wildfires

www.nrfirescience.org/resource/11193

Smoke exposure measurements among firefighters at wildfires in the Western United States between 1992 and 1995 showed that altogether most exposures were not significant, between 3 and 5 percent of the shift-average exposures exceeded occupational exposure limits for carbon monoxide and respiratory irritants. Exposure to benzene and...

Author(s): Timothy E. Reinhardt, Roger D. Ottmar

Year Published: 2000
Type: Document
Technical Report or White Paper

Interim air quality policy on wildland and prescribed fires

www.nrfirescience.org/resource/12446

This policy statement has been prepared in response to plans by some Federal, tribal and State wildland owners/managers to significantly increase the use of wildland and prescribed fires to achieve resource benefits in the wildlands. Many wildland ecosystems are considered to be unhealthy as a result of past management strategies....

Author(s): U.S. Environmental Protection Agency

Year Published: 1998

Type: Document

Technical Report or White Paper

Fire and smoke in Montana forests

www.nrfirescience.org/resource/13133

The concept of forest fire is especially difficult to deal with in an objective manner because fire has deep psychological associations for most animals, especially man. Moreover, attitudes toward forest fires have been greatly conditioned by what has been called the most effective advertising campaign in history...

Author(s): William R. Beaufait

Year Published: 1971

Type: Document

Book or Chapter or Journal Article