

Adding to Fire Fighter Safety by Including Real-Time Radar Data in Short-Range Forecasts of Thunderstorm-Induced Wind Shifts

www.nrfirescience.org/resource/23511

Abrupt changes in wind direction and speed caused by thunderstorm-generated gust fronts can, within a few seconds, transform slow-spreading low-intensity flanking fires into high-intensity head fires. Flame heights and spread rates can more than double. Fire mitigation strategies are challenged and the safety of fire crews is put at...

Author(s): Gary Achtemeier, Scott L. Goodrick

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Wildland firefighters' thermal exposure in relation to suppression tasks

www.nrfirescience.org/resource/23354

The main purpose of this study was to characterise the thermal environment and risk of heat burns of wildland firefighters in relation to the suppression tasks performed in real wildland fires. Measurements of air temperature and heat flux were performed by affixing heat flux and ambient temperature sensors on the outer and inner...

Author(s): Belén Carballo-Leyenda, José G. Villa, Jorge López-Satué, Jose A. Rodríguez-Marroyo

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Wildland firefighter exposure to smoke and COVID-19: A new risk on the fire line

www.nrfirescience.org/resource/22850

Throughout the United States, wildland firefighters respond to wildfires, performing arduous work in remote locations. Wildfire incidents can be an ideal environment for the transmission of infectious diseases, particularly for wildland firefighters who congregate in work and living settings. In this review, we examine how exposure...

Author(s): Kathleen M. Navarro, Kathleen A. Clark, Daniel J. Hardt, Colleen Reid, Peter Lahm, Joseph W. Domitrovich, Corey Butler, John R. Balmes

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

A digital twin framework for machine learning optimization of aerial fire fighting and pilot safety

www.nrfirescience.org/resource/22627

The objective of this work is to model and simulate aerial drops of fire retardants in dangerous fire environments. Specifically, the work develops a computational framework for a model problem combining: [1.] A meshless discrete element component that tracks the trajectory of released airborne materials from a controlled aircraft...

Author(s): T. I. Zohdi

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

The association between heart rate variability, reaction time, and indicators of workplace fatigue in wildland firefighters

www.nrfirescience.org/resource/23410

Purpose: To understand the association between heart rate variability and indices of fatigue, total sleep time, and reaction time in shift workers. Methods: Ten participants from the British Columbia Wildfire

Service management team were examined over a 14-day active fire-line period. Daily measures of subjective fatigue, sleepiness...

Author(s): Andrew T. Jeklin, Andrew S. Perrotta, Hugh W. Davies, Shannon S. D. Bredin, Dion A. Paul, Darren E. R. Warburton

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

The association between poor sleep and the incidence of sport and physical training-related injuries in adult athletic populations: a systematic review

www.nrfirescience.org/resource/23071

Background: The importance of achieving an adequate amount of sleep to optimize health and athletic performance is well recognized. Yet, a systematic evidence compilation of the risk for sport-related injury in adult athletic populations due to poor sleep does not exist. Objective: To examine the association between poor sleep and...

Author(s): Devon A. Dobrosielski, Lisa Sweeney, Peter J. Lisman

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Differential cardiopulmonary health impacts of local and long-range transport of wildfire smoke

www.nrfirescience.org/resource/22930

We estimated cardiopulmonary morbidity and mortality associated with wildfire smoke (WFS) fine particulate matter (PM_{2.5}) in the Front Range of Colorado from 2010 - 2015. To estimate WFS PM_{2.5}, we developed a daily kriged PM_{2.5} surface at a 15km X 15km resolution based on the Environmental Protection Agency Air Quality System...

Author(s): Sheryl Magzamen, Ryan W. Gan, Jingyang Liu, Katelyn O'Dell, Bonne Ford Hotmann, Kevin Berg, Kirk Bol, Ander Wilson, Emily V. Fischer, Jeffrey R. Pierce

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

We can provide a universal Basic Fireline Life Support system – and we should

www.nrfirescience.org/resource/20872

The National Wildfire Coordination Group (NWCG) has done a good job of prioritizing safety in wildland fire operations and promoting human life over property. For example, fireline checklists inspired by aviation safety prove their worth every day. Nevertheless, the work remains — and will always be — inherently dangerous. There...

Author(s): Eli Schned

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Firefighter neural function and decision-making following rapid heat stress

www.nrfirescience.org/resource/22416

In the present experiment we evaluated the impact of rapid heat stress on decision-making and neural function. Previous work has demonstrated that heat stress has an impact on cognitive and neural function. Here, we hypothesized that a rapid increase in heat stress would result in reduced decision-making ability evidenced by a...

Author(s): Cory J. Coehoorn, Lynne A. Stuart-Hill, Wande Abimbola, J. Patrick Neary, Olave E. Krigolson

Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Wildland firefighter smoke exposure and risk of lung and cardiovascular disease

www.nrfirescience.org/resource/22027

Wildland firefighters are exposed to health hazards including inhaling hazardous pollutants from the combustion of live and dead vegetation (smoke) and breathe soil dust, while working long shifts with no respiratory protection. This research brief summarizes a study analyzing long-term health impacts of smoke exposure for wildland...

Author(s): Kathleen M. Navarro, Linda Mutch

Year Published: 2020

Type: Document

Research Brief or Fact Sheet

Optimizing Firefighter Nutrition: Average Glycemic Index of Fireline Meals

www.nrfirescience.org/resource/21941

As wildfire seasons have expanded in duration and intensity, the effort and dedication required of wildland firefighters have increased (Withen 2015). Firefighters now work from April, when fuels first become available for burning, until well into the winter months of December and January. As fire seasons have grown into "fire..."

Author(s): Ben McLane

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Improving firefighter tenability during entrapment and burnover: An analysis of vehicle protection systems

www.nrfirescience.org/resource/21849

When attempting to suppress severe wildfire the possibility for firefighting crews to be overrun by wildfire, known as entrapment and burnover, remains a catastrophic and all too common occurrence. While improvements have been made to vehicle protection systems to increase the safety of firefighters caught in burnover, the potential...

Author(s): Greg Penney, Daryoush Habibi, Marcus Cattani

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

The potential impact of bushfire smoke on brain health

www.nrfirescience.org/resource/21679

Smoke from bushfires (also known as wildfires or forest fires) has blanketed large regions of Australia during the southern hemisphere summer of 2019/2020, potentially endangering residents who breathe the polluted air. While such air pollution is known to cause respiratory irritation and damage, its effect on the brain is not well...

Author(s): Laura A. Milton, Anthony R. White

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

A robust p-Center problem under pressure to locate shelters in wildfire context

www.nrfirescience.org/resource/21481

The location of shelters in different areas threatened by wildfires is one of the possible ways to reduce fatalities in a context of an increasing number of catastrophic and severe wildfires. These shelters will enable the population in the area to be protected in case of fire outbreaks. The subject of our study is to determine the...

Author(s): Marc Demange, Virginie Gabrel, Marcel A. Haddad, Cécile Murat

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Hot, tired and hungry: the snacking behaviour and food cravings of firefighters during multi-day simulated wildfire suppression

www.nrfirescience.org/resource/21129

Firefighters are exposed to numerous stressors during wildfire suppression, including working in hot temperatures and sleep restricted conditions. Research has shown that when sleep restricted, individuals choose foods higher in carbohydrates, fat, and sugar, and have increased cravings for calorie dense foods. However, there is...

Author(s): Charlotte C. Gupta, Sally A. Ferguson, Brad Aisbett, Michelle Dominiak, Stephanie E.

Chappel, Madeline Sprajcer, Hugh H. K. Fullagar, Saman Khalesi, Joshua H. Guy, Grace E. Vincent

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Seasonal changes in wildland firefighter fitness and body composition

www.nrfirescience.org/resource/20912

Hiking with a pack is the highest-intensity task that wildland firefighters (WLFFs) perform during sustained activities related to wildland fire suppression. Firefighters perform this and other tasks together as a crew; this provides a unique model to evaluate select physical and physiological changes in members of working crews...

Author(s): Steven E. Gaskill, Charles L. Dumke, Charles G. Palmer, Brent Ruby, Joseph W.

Domitrovich, Joseph A. Sol

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Measuring acute pulmonary responses to occupational wildland fire smoke exposure using exhaled breath condensate

www.nrfirescience.org/resource/20850

Wildland firefighters are directly exposed to elevated levels of wildland fire (WF) smoke. Although studies demonstrate WF smoke exposure is associated with lung function changes, few studies that use invasive sample collection methods have been conducted to investigate underlying biochemical changes. These methods are also either...

Author(s): Chieh-Ming Wu, Anna M. Adetona, Chi Song, Luke P. Naeher, Olorunfemi Adetona

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Responding to simultaneous crises: communications and social norms of mask behavior during wildfires and COVID-19

www.nrfirescience.org/resource/22265

The ongoing COVID-19 pandemic and the potential for co-occurring wildfires pose health threats to

people around the globe. Along with the direct impacts of wildfires, exposure to fine particulate matter (PM 2.5)—pollution composed of small inhalable particles with diameters of 2.5 micrometers or smaller—from wildfire smoke is a...

Author(s): Francisca N. Santana, Stephanie L. Fischer, Marika O. Jaeger, Gabrielle Wong-Parodi

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

The Smoke That You Shouldn't Have

www.nrfirescience.org/resource/21943

In 2018, Fire Management Today carried an article on smoke exposure (6 Minutes for Safety 2018). The article describes actions you can take to mitigate smoke exposure and techniques for reducing the exposure of firefighters to heavy smoke. The article is very informative, with a lot of good points to consider. I would suggest...

Author(s): Randall C. Thomas

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Modeling Wildland Firefighter Travel Rates by Terrain Slope: Results from GPS-Tracking of Type 1 Crew Movement

www.nrfirescience.org/resource/21926

Escape routes keep firefighters safe by providing efficient evacuation pathways from the fire line to safety zones. Effectively utilizing escape routes requires a precise understanding of how much time it will take firefighters to traverse them. To improve this understanding, we collected GPS-tracked travel rate data from US...

Author(s): Patrick R. Sullivan, Michael J. Campbell, Philip E. Dennison, Simon C. Brewer, Bret W. Butler

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Landscape and Wildfires Seminary: Diagnosis and suppression, methodological advances

www.nrfirescience.org/resource/21839

In 2015, researchers from the U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station, Human Dimensions Program (hereafter U.S. Forest Service), and the University of Córdoba, Forest Engineering Department, Forest Fire Laboratory, Spain (hereafter University of Cordoba), entered into an official Memorandum of...

Author(s): Francisco Rodriguez y Silva, Juan Ramón Molina Martínez, Matthew P. Thompson, Kit O'Connor

Year Published: 2020

Type: Document

Technical Report or White Paper

Total energy intake and self-selected macronutrient distribution during wildland fire suppression

www.nrfirescience.org/resource/21506

Introduction: Wildland firefighters (WLFF) work long hours in extreme environments, resulting in high daily total energy expenditure. Increasing work-shift eating episodes and/or providing rations that promote convenient eating has shown augmented self-selected work output, as has regular carbohydrate (CHO) consumption. It remains...

Author(s): Alexander N. Marks, Joseph A. Sol, Joseph W. Domitrovich, Molly West, Brent Ruby
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

On the Protective Performance of Firefighters' Garments: Air Gaps Between Fabric Layers
www.nrfirescience.org/resource/21004

...
Author(s): Ahmed Ghazy
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Noise exposures and perceptions of hearing conservation programs among wildland firefighters
www.nrfirescience.org/resource/20497

Wildland firefighters are exposed to numerous noise sources that may be hazardous to their hearing. This study examined the noise exposure profiles for 264 wildland firefighters across 15 job categories. All 264 firefighters completed questionnaires to assess their use of hearing protection devices, enrollment in hearing...
Author(s): George A. Broyles, Chucru A. Kardous, Peter B. Shaw, Edward F. Krieg
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A Classification of US Wildland Firefighter Entrapments Based on Coincident Fuels, Weather, and Topography

www.nrfirescience.org/resource/20131
Previous attempts to identify the environmental factors associated with firefighter entrapments in the United States have suggested that there are several common denominators. Despite the widespread acceptance of the assumed commonalities, few studies have quantified how often entrapments actually meet these criteria. An analysis of...
Author(s): Wesley G. Page, Patrick H. Freeborn, Bret W. Butler, William Matt Jolly
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A review of US wildland firefighter entrapments: trends, important environmental factors and research needs

www.nrfirescience.org/resource/19936
Wildland firefighters in the United States are exposed to a variety of hazards while performing their jobs. Although vehicle accidents and aircraft mishaps claim the most lives, situations where firefighters are caught in a life-threatening, fire behaviour-related event (i.e. an entrapment) constitute a considerable danger because...
Author(s): Wesley G. Page, Patrick H. Freeborn, Bret W. Butler, William Matt Jolly
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Wildland firefighting: adverse influence on indices of metabolic and cardiovascular health
www.nrfirescience.org/resource/19580

OBJECTIVE: The purpose of this study was to evaluate pre- and postseason measures of body composition, skeletal muscle, and blood parameters/liver lipid in wildland firefighters (WLFF) over the fire season. **METHODS:** Alaskan WLFF (N = 27) crews were evaluated pre- and postwildfire season, which included 63 ± 10 operational...

Author(s): R.H. Coker, C.J. Murphy, M. Johannsen, G. Galvin, B.C. Ruby

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Detecting changes in the heart rate of firefighters to prevent smoke inhalation and health effects

www.nrfirescience.org/resource/19811

Firefighters can suffer serious health problems and experience cardiac disorders derived from high pollutants inhalation. During experimental field burns, environmental and heart rate data from firefighters were collected and it was possible to observe that changes in heart rate were related with variations in pollutants inhalation...

Author(s): Raquel Sebastião, Sandra Sorte, Joana Valente, Ana Isabel Miranda, José Maria Fernandes

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Comment on Collins, C.N.; et al. Body Composition Changes of United States Smokejumpers during the 2017 Fire Season. Fire 2018, 1, 48

www.nrfirescience.org/resource/19299

from text "In the recent manuscript by Collins et al. [1], the authors conclude that the manuscript sample (n = 9) of wildland firefighters (WLFFs) experienced changes in body composition across the 2017 season. However, the authors outline a misconception of what body composition analyses may provide agencies and fire crews in...

Author(s): Brent Ruby

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Firefighter Observations of “Surprising” Fire Behavior in Mountain Pine Beetle-Attacked Lodgepole Pine Forests

www.nrfirescience.org/resource/19750

The recent mountain pine beetle outbreak affecting lodgepole pine forests in the Rocky Mountains has created a novel fire environment for wildland firefighters. This paper presents results from an examination of firefighters' observations of fire behavior in post-outbreak lodgepole pine forests, with a focus on what they...

Author(s): Kevin Moriarty, Anthony S. Cheng, Chad M. Hoffman, Stuart P. Cottrell, Martin E. Alexander

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Predicting fire spread and behaviour on the fireline. Wildfire analyst pocket: a mobile app for wildland fire prediction

www.nrfirescience.org/resource/19204

Accurately predicting fire spread and behaviour on the fireline, in the field, is highly important in order to prevent the loss of human life, improve the success of initial attack and better understand the potential fire behaviour, minimizing many risks for firefighters. We present the Wildfire Analyst™ Pocket Edition application...

Author(s): Santiago Monedero, Joaquin Ramírez, Adrián Cardil
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

An assessment of research needs related to wildland firefighter safety - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/19623

Wildland firefighters in the United States (US) are exposed to a variety of hazards while performing their jobs in America's wildlands. Although the threats posed by vehicle accidents, aircraft mishaps and heart attacks claim the most lives (Figure 1), situations where firefighters are caught in a life-threatening, fire behavior-...

Author(s): William Matt Jolly, Bret W. Butler, Wesley G. Page, Patrick H. Freeborn
Year Published: 2019
Type: Document
Technical Report or White Paper

Shifting the safety rules paradigm: introducing doctrine to US wildland firefighting operations

www.nrfirescience.org/resource/19157

Safety rules have long been associated with a rationalist or compliance/violation logic, meaning that workers must comply with rules, and can expect disciplinary action if they violate them. In recent years, scholars have begun to introduce an adaptation safety paradigm, proposing that rules should be used as 'tools' for flexible...

Author(s): Jody L. Jahn
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Modeling ground firefighting resource activities to manage risk given uncertain weather

www.nrfirescience.org/resource/20415

Wildland firefighting requires managers to make decisions in complex decision environments that hold many uncertainties; these decisions need to be adapted dynamically over time as fire behavior evolves. Models used in firefighting decisions should also have the capability to adapt to changing conditions. In this paper, detailed...

Author(s): Erin J. Belval, Yu Wei, Michael Bevers
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Examining barriers, motivators and injury related to physical training in wildland firefighters

www.nrfirescience.org/resource/20099

Fitness is critical in keeping wildland firefighters (WLFFs) healthy and safe from injury. Unfortunately, little is known about the physical training (PT) programs of WLFFs. The purpose of this study was to understand motivators, barriers and injuries related to PT. We used a descriptive research design. Information about PT...

Author(s): Annie Sondag, Valerie J. Moody, Aria Mangan
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Escape Route Index: A Spatially-Explicit Measure of Wildland Firefighter Egress Capacity

www.nrfirescience.org/resource/19854

For wildland firefighters, the ability to efficiently evacuate the fireline is limited by terrain, vegetation, and fire conditions. The impacts of terrain and vegetation on evacuation time to a safety zone may not be apparent when considering potential control locations either at the time of a wildfire or during pre-suppression...

Author(s): Michael J. Campbell, Wesley G. Page, Philip E. Dennison, Bret W. Butler

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Reply to Ruby, B. Comment on Collins, C.N., et al. Body Composition Changes of United States Smokejumpers during the 2017 Fire Season. Fire. 2018, 1, 48. Fire 2019, 2, 15

www.nrfirescience.org/resource/19300

from the text "Ruby [1] helped identify minor text mistakes or areas for clarification that occurred in Collins et al. [2]. The text mistakes in the article do not affect the study results and in each case help to strengthen clarity of the study methods and validity of the results. For this, Dr. Ruby is thanked for his evaluation....

Author(s): Randall H. Brooks

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Firefighter tenability and its influence on wildfire suppression

www.nrfirescience.org/resource/19799

This paper provides analysis of international fire service siege wildfire suppression thresholds and reports on the effect of forest fuel structure, fire weather condition and terrain on the suitability of suppression strategies. Further, this study applies a fire engineering approach whereby siege wildfire behaviour is...

Author(s): Greg Penney, Daryoush Habibi, Marcus Cattani

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Descriptive analysis of injuries and illnesses self-reported by wildland firefighters

www.nrfirescience.org/resource/19715

Wildland firefighters working in remote environments with steep terrain, uneven ground, variable temperatures and fluctuating elevations cultivate injury risk. The purpose of this study was to understand types of injuries and illnesses wildland firefighters (WLFFs) sustain during the fire season.

This study was a web-based cross-...

Author(s): Valerie J. Moody, Taylor J. Purchio, Charles G. Palmer

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

The effects of hydration on cognitive performance during a simulated wildfire suppression shift in temperate and hot conditions

www.nrfirescience.org/resource/19192

The effects on dehydration and cognitive performance from heat and/or physical activity are well established in the laboratory, although have not yet been studied for personnel working in occupations such as wildland firefighting regularly exposed to these types of conditions. This study aimed to

investigate the effects of...

Author(s): Michael A. Cvirn, Jillian Dorrian, Bradley P. Smith, Grace E. Vincent, Sarah M. Jay, Greg D. Roach, Charli Sargent, Brianna Larsen, Brad Aisbett, Sally A. Ferguson

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Evaluation of Contributing Factors to Wildland Firefighter Fatalities in the United States

www.nrfirescience.org/resource/22660

Wildland firefighter fatalities are not caused by one single factor. Catastrophic fires are on the rise, civilian and firefighter deaths are on the rise, particularly volunteer firefighters. The WUI is growing at a faster pace than ever recorded and suppression and economic costs are skyrocketing. There is not one contributing...

Author(s): Anjeleeca M. Tomayko

Year Published: 2019

Type: Document

Dissertation or Thesis

Body Composition Changes of United States Smokejumpers during the 2017 Fire Season

www.nrfirescience.org/resource/18749

Wildland firefighting is arduous work with extreme physical and nutritional demands that often exceeds those of athletes competing in sports. The intensity and duration of job demands, impacts the amount of calories burned, which can influence body composition. The purpose of this study was to determine if the body composition of...

Author(s): Callie N. Collins, Randall H. Brooks, Benjamin D. Sturz, Andrew S. Nelson, Robert F. Keefe

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

A report on a national meeting of wildland fire leaders meeting – united to reduce line-of-duty deaths and injuries of wildland firefighters

www.nrfirescience.org/resource/18150

Too many of our brothers and sisters in the fire service are dying in the line of duty while fighting fire in the wildland environment. Data suggests wildland firefighters die at a higher rate than those involved in structural fire response, and the emotional, social and fiscal costs of wildland firefighter death, accident, and...

Author(s): Tom Harbour

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Examining dispatching practices for interagency hotshot crews to reduce seasonal travel distance and manage fatigue

www.nrfirescience.org/resource/18121

Interagency Hotshot Crews (IHCs) are a crucial firefighting suppression resource in the United States. These crews travel substantial distances each year and work long and arduous assignments that can cause accumulated fatigue. Current dispatching practices for these crews are supposed to send the closest resource while adhering to...

Author(s): Erin J. Belval, David E. Calkin, Yu Wei, Crystal S. Stonesifer, Matthew P. Thompson, Alex Taylor Masarie

Year Published: 2018

Type: Document
Book or Chapter or Journal Article

Assessment of urinary protein composition in response to consecutive days of wildland firefighting

www.nrfirescience.org/resource/19586

The purpose of this study was to examine the pattern of urinary protein excretion induced by 3 consecutive days of wildland firefighting. Eighteen male active-duty military personnel served as the participants. All testing on the 3 consecutive days was conducted at a Northwestern USA fire camp. All participants consumed military-...

Author(s): N. Yasuda, B.C. Ruby

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Sleep in wildland firefighters: what do we know and why does it matter?

www.nrfirescience.org/resource/17362

Wildland firefighters perform physical work while being subjected to multiple stressors and adverse, volatile working environments for extended periods. Recent research has highlighted sleep as a significant and potentially modifiable factor impacting operational performance. The aim of this review was to (1) examine the existing...

Author(s): Grace E. Vincent, Brad Aisbett, Alexander Wolkow, Sarah M. Jay, Nicola D. Ridgers, Sally A. Ferguson

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Understanding Factors Contributing to Wildland Firefighter Health, Safety, and Performance: A Pilot Study on Smokejumpers

www.nrfirescience.org/resource/22658

Wildland firefighters have arduous and hazardous occupations and are being killed or injured at alarming rates with 1,114 killed while on assignment between 1994 and 2016. Thus, improving wildland firefighter health and safety is a National priority. Incident reports typically highlight situational awareness and communication as key...

Author(s): Callie N. Collins

Year Published: 2018

Type: Document

Dissertation or Thesis

Everyone goes home in the wildland

www.nrfirescience.org/resource/18857

In 2017, the NFFF began the process of conducting a wide-scale needs assessment to identify vulnerabilities, attitudes, and intervention opportunities related to wildland firefighter health and safety. A survey was broadly disseminated, and six regional listening sessions were held to provide stakeholders with the opportunity to...

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

Fuel and topographic influences on wildland firefighter burnover fatalities in Southern California

www.nrfirescience.org/resource/18209

Previous reviews of wildfires where a fatal firefighter turnover occurred have found that the incidents usually share similar characteristics in terms of the fire environment, such as steep slopes and complex topography (e.g. box canyons). Despite these similarities, systematic identification and communication of the locations where...

Author(s): Wesley G. Page, Bret W. Butler

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Taking Care of Us: The Art of Listening

www.nrfirescience.org/resource/18149

...

Author(s): Kathy Clay

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Metabolic demand of hiking in wildland firefighting

www.nrfirescience.org/resource/19584

Introduction: The objective of this study was to document characteristics of hiking during wildland firefighter (WLFF) training and wildfire suppression. For the first time, the overall physical demands during wildland firefighting were evaluated in the field using global positioning systems coupled with wireless physiological...

Author(s): Joseph A. Sol, Brent Ruby, Steven E. Gaskill, Charles L. Dumke, Joseph W. Domitrovich

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

How do weather and terrain contribute to firefighter entrapments in Australia?

www.nrfirescience.org/resource/17122

Adverse weather conditions and topographic influences are suspected to be responsible for most entrapments of firefighters in Australia. A lack of temporally and spatially coherent set of data however, hinders a clear understanding of the contribution of each weather type or terrain driver on these events. We investigate coronial...

Author(s): Sébastien Lahaye, J. Sharples, Stuart Matthews, Simon Heemstra, Owen F. Price, Rachel Badlan

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Wildland fire radio communication -common myths and best practices

www.nrfirescience.org/resource/18958

This Research Brief summarizes findings of a Joint Fire Science Program project focused on understanding radio communications as part of risk communication and sensemaking in wildland fire operations. Through observation of live and simulated radio conversations, analysis of training materials, and interviews with a variety of...

Author(s): Anne E. Black, Rebekah L. Fox, Elena Gabor, David Thomas, Jennifer Ziegler

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

The sleep behaviour and fatigue trends of wildland firefighters during non-fire and fire deployments

www.nrfirescience.org/resource/23067

Ontario wildland firefighting is a hazardous and safety-critical operation with relatively high injury rates. This is indicated by the 10-year average of 4.46 lost-time injuries per 100 workers in Ontario wildland firefighting compared to 0.95-1.88 lost-time injuries in other occupations, as reported by the Workplace Safety and...

Author(s): Zachary McGillis

Year Published: 2017

Type: Document

Dissertation or Thesis

Wildland Fire Smoke Health Effects on Wildland Firefighters and the Public - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17009

Wildland fire smoke is a complex mixture of air contaminants that have the potential cause adverse health effects. Individuals can be exposed occupationally if they work as wildland firefighters or public exposure from ambient air that is contaminated with smoke from a nearby or distant wildland fire.

Previous studies of public...

Author(s): Joe Domitrovich, George Broyles, Roger D. Ottmar, Timothy E. Reinhardt, Luke P. Naeher, Michael T. Kleinman, Kathleen M. Navarro, Christopher E. Mackay, Olorunfemi Adetona

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

A LiDAR-based analysis of the effects of slope, vegetation density, and ground surface roughness on travel rates for wildland firefighter escape route mapping

www.nrfirescience.org/resource/16288

Escape routes are essential components of wildland firefighter safety, providing pre-defined pathways to a safety zone. Among the many factors that affect travel rates along an escape route, landscape conditions such as slope, lowlying vegetation density, and ground surface roughness are particularly influential, and can be measured...

Author(s): Michael J. Campbell, Philip E. Dennison, Bret W. Butler

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Cultivating a reluctance to simplify: exploring the radio communication context in wildland firefighting

www.nrfirescience.org/resource/19228

Although communication is often cited as a contributor to organisational accidents, complexities of the communication context are still understudied. In training materials and some investigative reports, communication is often presented as an equipment issue or as a simple skill that can be picked up on the job. However, interviews...

Author(s): Rebekah L. Fox, Elena Gabor, David Thomas, Jennifer Ziegler, Anne E. Black

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

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

Using reverse geocoding to identify prominent wildfire evacuation trigger points

www.nrfirescience.org/resource/16290

Wildfire evacuation trigger points are prominent geographic features (e.g., ridge lines, rivers, and roads) utilized in timing evacuation warnings. When a fire crosses a feature, an evacuation warning is issued to the communities or firefighters in the path of the fire. Current methods for generating trigger buffers have limited...

Author(s): Dapeng Li, Thomas J. Cova, Philip E. Dennison

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Wildland Firefighters' Self-Reported Nutrition and Hydration Concerns that May Impact Health and Safety

www.nrfirescience.org/resource/22657

Objective: The purpose of this study was to identify wildland firefighters' (WLFFs) self-reported hydration and nutrition practices, they perceived may impact health and safety while on an active fire assignment in the United States. Study Design, Setting, Participants: Using an online format, WLFFs (n=422) were asked two open-...

Author(s): Samantha Worden, Callie N. Collins, Annie Roe, Katie Brown, Alistair M. S. Smith, Crystal A. Kolden, Andrew S. Nelson, Randy Brooks, Samantha Ramsay

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Sleep quantity and quality is not compromised during planned burn shifts of less than 12 h

www.nrfirescience.org/resource/23074

Planned burning is a preventative strategy aimed at decreasing fuel loads to reduce the severity of

future wildfire events. During planned burn operations, firefighters can work long shifts. Furthermore, remote burning locations may require firefighters to sleep away from home between shifts. The existing evidence surrounding...

Author(s): Grace E. Vincent, Brad Aisbett, Sarah J. Hall, Sally A. Ferguson

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Butte Fire Staff Ride - Preliminary Study

www.nrfirescience.org/resource/18001

On the afternoon of Aug. 29, 1985, the Butte Fire on the Salmon National Forest in central Idaho made a sudden high-intensity crown run up Wallace Creek, a side drainage of the Salmon River. Over the next 90 minutes, this run consumed 3,500 acres. Approximately 118 persons on the Division—including hand crews,...

Author(s): David Thomas

Year Published: 2016

Type: Document

Technical Report or White Paper

Do staff rides help move the Forest Service toward its goal of becoming a learning organization?

www.nrfirescience.org/resource/18008

The Forest Service has declared its intention of becoming a learning organization. As a means to that end, the Forest Service has borrowed and adapted the staff ride concept from the military. This paper describes the staff ride product and compares it to what scientific research tells us about the nature of learning. Focus group...

Author(s): Joseph R. Harris

Year Published: 2015

Type: Document

Dissertation or Thesis

Fighting fire and fatigue: sleep quantity and quality during multi-day wildfire suppression

www.nrfirescience.org/resource/23073

This study examined firefighters' sleep quantity and quality throughout multi-day wildfire suppression, and assessed the impact of sleep location, shift length, shift start time and incident severity on these variables. For 4 weeks, 40 volunteer firefighters' sleep was assessed using wrist actigraphy. Analyses revealed that the...

Author(s): Grace E. Vincent, Brad Aisbett, Sarah J. Hall, Sally A. Ferguson

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Seasonal heat acclimatization in wildland firefighters

www.nrfirescience.org/resource/19591

The purpose of this study was to determine changes in physiological markers of heat acclimatization across a 4-month wildland fire season. Wildland firefighters (WLFF) (n=12) and non-WLFF (n =14) were assessed pre- and post-season for body mass, percent body fat, and peak V.O₂. Both groups completed a 60-min heat stress trial (...)

Author(s): Brianna Lui, John S. Cuddy, Walter S. Hailes, Brent Ruby

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Work patterns dictate energy demands and thermal strain during wildland firefighting

www.nrfirescience.org/resource/19589

OBJECTIVE: The purpose of this investigation was to characterize the effects of self-selected work activity on energy expenditure, water turnover, and thermal strain during wildland fire suppression. A secondary aim was to contrast current data with data collected 15 years ago using similar methods to determine whether job demands...

Author(s): John S. Cuddy, Joseph A. Sol, Walter S. Hailes, Brent Ruby

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Wildland firefighter entrapment avoidance: modelling evacuation triggers

www.nrfirescience.org/resource/12429

Wildland firefighters are often called on to make tactical decisions under stressful conditions in order to suppress a fire. These decisions can be hindered by human factors such as insufficient knowledge of surroundings and conditions, lack of experience, overextension of resources or loss of situational awareness. One potential...

Author(s): Gregory K. Fryer, Philip E. Dennison, Thomas J. Cova

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Twelfth international wildland fire safety summit proceedings

www.nrfirescience.org/resource/12403

In October, the 12th International Wildland Fire Safety Summit in Sydney, Australia brought together students of fire from all over the world to explore new approaches in wildland fire safety. Participants attended from the USA, Switzerland, Hong Kong, France, New Zealand and Australia to take part in the summit.

Author(s): Rebekah L. Fox

Year Published: 2013

Type: Document

Conference Proceedings

Cramer Staff Ride: Preliminary study

www.nrfirescience.org/resource/18011

The Cramer fire began as a fairly typical mid-slope ignition on the south-facing slope of the steep Salmon River Canyon during an extended drought that saw live fuel moistures in late July falling below the benchmark record of 2000. On July 22, the fourth day after ignition, and three days from detection and engagement, the fire...

Year Published: 2012

Type: Document

Technical Report or White Paper

Glycogen levels in wildland firefighters during wildfire suppression

www.nrfirescience.org/resource/19595

OBJECTIVE: The purpose of this project was to determine the effects of wildfire suppression on muscle glycogen utilization in wildland firefighters (WLFFs). METHODS: Wildland firefighters (n = 11) participated in the study. Muscle biopsies were obtained from the vastus lateralis pre- and post-work

shift. Activity patterns were...

Author(s): John S. Cuddy, D.R. Slivka, T.J. Tucker, Walter S. Hailes, Brent Ruby

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

The exposure index: developing firefighter safety performance measures

www.nrfirescience.org/resource/16182

A cornerstone of effective institutional learning and accountability is the development, tracking, and analysis of informative performance measures. In a previous issue of Fire Management Today ("A New Look at Risk Management," Winter 2011), a series of articles highlighted the importance of organizational safety and risk management...

Author(s): David E. Calkin, John Phipps, Thomas P. Holmes, Jon D. Rieck, Matthew P. Thompson

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

High work output combined with high ambient temperatures caused heat exhaustion in a wildland firefighter despite high fluid intake

www.nrfirescience.org/resource/19592

The purpose of this case study is to examine the physiological/behavioral factors leading up to heat exhaustion in a male wildland firefighter during wildland fire suppression. The participant (24 years old, 173 cm, 70 kg, and 3 years firefighting experience) experienced heat exhaustion following 7 hours of high ambient temperatures...

Author(s): John S. Cuddy, Brent Ruby

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

How big was Dodge's escape fire?

www.nrfirescience.org/resource/8289

Several published accounts exist of how smokejumper foreman Wag Dodge survived the 1949 Mann Gulch Fire in northwestern Montana by setting an 'escape fire' in cured grass fuels, the most notable among them being Norman Maclean's 1992 book *Young Men and Fire*. Two other smokejumpers survived by reaching a rockslide. Sadly, 12...

Author(s): Martin E. Alexander

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

An analysis of Dodge's escape fire on the 1949 Mann Gulch Fire in terms of a survival zone for wildland firefighters

www.nrfirescience.org/resource/11020

The Wildland Fire Operations Research Group of FPInnovations-Ferac Division in collaboration with the University of Alberta initiated a project in late 2007 at the request of its stakeholders to examine and define the limits of wildland firefighter safety and survival zones. Part of this project involves examining past wildfire...

Author(s): Martin E. Alexander, Mark Y. Ackerman, Gregory J. Baxter

Year Published: 2009

Type: Document

Conference Proceedings

Effects of an electrolyte additive on hydration and drinking behavior during wildfire suppression

www.nrfirescience.org/resource/19598

OBJECTIVE: The purpose of this study was to compare the effects of a water + electrolyte solution versus plain water on changes in drinking behaviors, hydration status, and body temperatures during wildfire suppression. METHODS: Eight participants consumed plain water, and eight participants consumed water plus an electrolyte...

Author(s): John S. Cuddy, J.A. Ham, S.G. Harger, D.R. Slivka, Brent Ruby

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Supplemental feedings increase self-selected work output during wildfire suppression

www.nrfirescience.org/resource/19604

PURPOSE: The purpose of this study was to determine the impact of supplemental feeding strategies on self-selected activity during wildland fire suppression. METHODS: Seventy-six wildland firefighters were studied in three experiments for three fire seasons. During the first two seasons, subjects consumed, in addition to their sack...

Author(s): John S. Cuddy, Steven E. Gaskill, B.J. Sharkey, S.G. Harger, Brent Ruby

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Use of human factors analysis for wildland fire accident investigations

www.nrfirescience.org/resource/196

Accident investigators at any level are challenged with identifying causal factors and making preventative recommendations. This task can be particularly complicated considering that 70-80% of accidents are associated with human error. Due to complexities of the wildland fire environment, this is especially challenging when...

Author(s): Michelle Ryerson, Chuck Whitlock

Year Published: 2005

Type: Document

Conference Proceedings

Wisdom in the Lessons Learned Library: work ethics and firefighter identities in the Fire Orders

www.nrfirescience.org/resource/15474

This paper analyzes historic and contemporary documents about the Ten Standard Fire Orders in the Lessons Learned Center Library and elsewhere, to examine how justifications for these traditional safety rules have changed over time. Using ethical theory as a lens for analysis, the paper shows how the original Fire Orders attempted...

Author(s): J.A. Thackaberry

Year Published: 2005

Type: Document

Conference Proceedings

Eighth international wildland firefighter safety summit: 10 years later

www.nrfirescience.org/resource/15458

These files contain the proceedings and poster papers from the International Association of Wildland Fire's Wildland Fire Safety Summit™ held in Missoula, Montana April 26-28, 2005. These proceedings contain the papers as submitted by the authors. Except for some editing to try and instill a common

format, these papers are as...

Year Published: 2005

Type: Document

Conference Proceedings

Deep survival: who lives, who dies and why

www.nrfirescience.org/resource/16217

Gonzales attempts to answer the question of why, in life threatening events, do some people survive and others die? In a series of true-life stories about people who have had skills and behaviors of "miraculous endurance" or who have met "sudden death," Gonzales describes how people get into life threatening jams and how...

Author(s): Laurence Gonzales

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

Wildland fire behavior case studies and analysis: part 2

www.nrfirescience.org/resource/15996

This resource is a special issue of Fire Management Today that includes articles on fire behavior and descriptions of specific large fires that have important lessons in fire fighter safety.

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

A "worldview" of disaster: organizational sensemaking in a wildland firefighting tragedy

www.nrfirescience.org/resource/16262

From documents related to the 1994 South Canyon fire in Colorado, Larson examines how two worldviews presented by J.R. Taylor in his book, "Rethinking the theory of organizational communication: how to read an organization" function as sensemaking tools, both retrospectively and during crisis decision making. As Taylor explains...

Author(s): Gregory Larson

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Water turnover and changes in body composition during arduous wildfire suppression

www.nrfirescience.org/resource/19603

INTRODUCTION: Our lab has recently documented the total energy expenditure during arduous wildfire suppression using the doubly labeled water methodology. The elevated rates of isotopic elimination indicate an arduous working environment that may often compromise energy balance and overall hydration. PURPOSE: The purpose of this...

Author(s): Brent Ruby, D.A. Schoeller, B.J. Sharkey, C. Burks, S. Tysk

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Human factors in fire behavior analysis: reconstructing the Dude Fire

www.nrfirescience.org/resource/15482

On the Dude Fire Staff Ride, we retraced the steps of people who were under pressure. Some of those people handled pressure well. Some didn't. For a richer understanding of the Dude Fire, we should

focus on what happens when people are overcome by events; then we might be in a better position to prevent similar tragedies in the...

Author(s): Karl E. Weick

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Total energy expenditure during arduous wildfire suppression

www.nrfirescience.org/resource/19607

PURPOSE: The purpose of this investigation was to determine the total energy expenditure (TEE) by using the doubly labeled water (DLW) methodology during 5 d of wildfire suppression in Montana, California, Florida, Washington, and Idaho. **METHODS:** Seventeen wildland firefighters (from three Interagency Hot Shot crews, N = 8 men,...

Author(s): Brent Ruby, T.C. Schriver, T.W. Zderic, B.J. Sharkey, C. Burks, S. Tysk

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Tool retention and fatalities in wildland fire settings: conceptualizing the naturalistic

www.nrfirescience.org/resource/16257

Comparing several well-known wildfires, Weick argues for a causal connection between firefighter tool retention and fatalities. To Weick, tools are an extension of firefighter identity and to drop one's tools is to let go of one's identity. He believes improvisation during high stress situations will increase safety and help...

Author(s): Karl E. Weick

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

Working with emotional intelligence

www.nrfirescience.org/resource/15821

Based on his earlier book, "Emotional Intelligence," Goleman applies years of research to this practical guide on emotional intelligence in organizations. In the first part of the book, Goleman makes a "hard case for soft skills" by arguing that emotional intelligence is paramount to IQ, or expertise, in determining who will...

Author(s): Daniel Goleman

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

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

Wildland firefighter safety awareness study: Phase 3 - implementing cultural changes for safety

www.nrfirescience.org/resource/15478

This Phase III report of the interagency "Wildland Firefighter Safety Awareness" project presents over 200 recommendations for improving the organizational culture, leadership, human factors and external influences that affect wildland firefighter safety. Together they are a set of detailed implementation strategies for meeting the...

Year Published: 1998

Type: Document

Technical Report or White Paper

Managing environmental uncertainty with legitimate authority: a comparative analysis of the Mann Gulch and Storm King Mountain Fires

www.nrfirescience.org/resource/15893

Alder recognizes two decisions common to both the Mann Gulch and Storm King Mountain fires that influenced the behavior of firefighters during critical moments: 1) failing to question authority and 2) failing to obey authority. He argues that these failures are based on individual perceptions of legitimate authority. There are four...

Author(s): G. Stoney Alder

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

The power of mindful learning

www.nrfirescience.org/resource/15832

Mindful learning takes place with an awareness of contexts and of the ever-changing nature of information. A mindful approach is distinguished by three characteristics: the continuous creation of new categories, openness to new information, and an implicit awareness of more than one perspective. Learning is hindered by popular...

Author(s): Ellen J. Langer

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

Attitude of wisdom: the experience component in wildland firefighter decisions

www.nrfirescience.org/resource/15476

Atwood notes that while managers must adopt a passion for safety, the true test is on the fire line. Supervisors are in charge of making decisions that ultimately put safety first, or not. Atwood argues that improvement will not come from the top down, or the outside in, and that firefighting experience is the most critical...

Author(s): George Atwood

Year Published: 1996

Type: Document

Book or Chapter or Journal Article

Drop your tools: an allegory for organizational studies

www.nrfirescience.org/resource/16256

One of the critical mistakes made by wildland firefighters during both the Mann Gulch and South Canyon fires was their unwillingness to drop heavy tools and packs as they attempted to outrun the flames. Weick points to 10 possible reasons for their unwillingness: listening, justification, trust, control, skill at dropping, skill...

Author(s): Karl E. Weick
Year Published: 1996
Type: Document
Book or Chapter or Journal Article

Wildland firefighter safety awareness study: Phase 2 - setting new goals for the organizational culture, leadership, human factors, and other areas impacting firefighter safety

www.nrfirescience.org/resource/15477

This report summarizes the results of Phase II of a four phase study to examine the Federal wildland firefighting community and to improve firefighter safety. The first phase described the strengths and problem areas of the current organizational culture, and considered leadership and accountability issues, human factors, and...

Year Published: 1996
Type: Document
Technical Report or White Paper

Wildland firefighter safety awareness study: Phase 1 - identifying the organizational culture, leadership, human factors, and other issues impacting firefighter safety

www.nrfirescience.org/resource/15475

There are many characterizations of wildland firefighters and their work culture. These characterizations vary across all levels of organizations, jurisdictions and types of jobs. As closely held as these perceptions are, as confident as each of us is with our own perceptions--it begs the question of what a systematic look at...

Year Published: 1996
Type: Document
Technical Report or White Paper

The collapse of decision making and organizational structure on Storm King Mountain

www.nrfirescience.org/resource/15470

Stress, fear, and panic predictably lead to the collapse of clear thinking and organizational structure. While these psychological and social processes have been well studied by the military and the aircraft industry (Cockpit Resource Management) (Weick 1990 and Wiener, Kanki, and Helmrich 1993), the wildland fire community has not...

Author(s): Ted Putnam
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

Findings from the Wildland Firefighters Human Factors Workshop. Improving wildland firefighter performance under stressful, risky conditions: Toward better decisions on the fireline and more resilient organizations

www.nrfirescience.org/resource/15468

It has become increasingly clear that wildland firefighters are experiencing collapses in decisionmaking and organizational structure when conditions on the fireline become life-threatening. Since 1990 wildland fire agencies have lost 23 people who might have survived had they simply dropped their tools and equipment for greater...

Author(s): Ted Putnam
Year Published: 1995
Type: Document
Technical Report or White Paper

Creating a passion for safety vs. management oversight & inspection

www.nrfirescience.org/resource/15472

I was disappointed with the OSHA report of the South Canyon Fire. My feelings are not the result of any need to defend my agency (USDA Forest Service). In another time and place, I thought the OSHA report following the death of Bill Martin (a smokejumper who died in a training jump) was right on target. In that instance I was...

Author(s): James M. Saveland

Year Published: 1995

Type: Document

Book or Chapter or Journal Article

Analysis of escape efforts and personal equipment on the South Canyon Fire

www.nrfirescience.org/resource/15469

This article is a detailed reconstruction of firefighter behavior and personal protective equipment use on the South Canyon Fire. Putnam reveals two failures that contributed to the deaths of 14 firefighters. First, many firefighters held onto their tools and packs during the escape effort. This slowed them down...

Author(s): Ted Putnam

Year Published: 1995

Type: Document

Book or Chapter or Journal Article

Addressing the common behavioral element in accidents and incidents

www.nrfirescience.org/resource/15451

Programs aimed at enhancing safety by addressing the proximate cause of an accident only consider a small portion of the safety picture. Merely addressing the proximate cause fails to consider that the system either directly or indirectly trains, reinforces, and even expects employees to demonstrate hazardous behavior. An effective...

Author(s): Curt Braun

Year Published: 1995

Type: Document

Conference Proceedings

Mann Gulch fire: a race that couldn't be won

www.nrfirescience.org/resource/11196

The Mann Gulch fire, which over ran 16 firefighters in 1949, is analyzed to show its probable movement with respect to the crew. The firefighters were smokejumpers who had parachuted near the fire on August 5, 1949. While they were moving to a safer location, the fire blocked their route. Three survived, the foreman who ignited...

Author(s): Richard C. Rothermel

Year Published: 1993

Type: Document

Technical Report or White Paper

The collapse of sensemaking in organizations: the Mann Gulch disaster

www.nrfirescience.org/resource/15592

The death of 13 men in the Mann Gulch fire disaster, made famous in Norman Maclean's Young Men and Fire, is analyzed as the interactive disintegration of role structure and sensemaking in a minimal organization. Four potential sources of resilience that make groups less vulnerable to disruptions of sensemaking are proposed to...

Author(s): Karl E. Weick
Year Published: 1993
Type: Document
Book or Chapter or Journal Article

Lookouts, communication, escape routes, safety zones

www.nrfirescience.org/resource/15460

In a presentation to the USDA Forest Service's national Fire and Aviation Staff, Gleason provides a clear overview of his proposed Lookouts, Communication, Escape Routes, Safety Zones (LCES) method of training firefighters for greater safety. After defining LCES, he discusses how it should be implemented on the ground. He emphasizes...

Author(s): Paul Gleason
Year Published: 1991
Type: Document
Management or Planning Document

Fire Management Notes

www.nrfirescience.org/resource/15997

This issue of Fire Management Notes contains articles on fire shelters, fire behavior, the Butte Fire (Idaho 1985), crew mobilization, and using prescribed fire.

Year Published: 1986
Type: Document
Book or Chapter or Journal Article

Lake Mountain Fire Entrapment: report on fire shelter deployment

www.nrfirescience.org/resource/15993

This report analyzed the events leading up to the Lake Mountain Fire entrapment in the Salmon National Forest, Idaho, in 1985. The authors looked at the fire and activities in terms of the 10 standard fire fighting orders and the 13 shout-out conditions and developed recommended actions to prevent fire shelter deployment...

Author(s): Dave Dahl, Jim Sweeney, Roy Keck
Year Published: 1985
Type: Document
Management or Planning Document

Lake Mountain Fire Entrapment: incident report

www.nrfirescience.org/resource/15994

This is a report summary that includes conclusions, recommendations, and interview from the safety officer on the fire entrapment incident in the Salmon National Forest on July 4, 1985.

Year Published: 1985
Type: Document
Management or Planning Document

Butte Fire Entrapment

www.nrfirescience.org/resource/15989

This pdf contains two letters and a record of the findings, interviews, and analysis of the use of fire shelters in the Butte Fire in Idaho in 1985.

Author(s): John A. Hafterson
Year Published: 1985
Type: Document

Death in Blackwater Canyon

www.nrfirescience.org/resource/11494

On August 21, 1937, the tragic Blackwater Fire caused the death of 15 firefighters, burning approximately 1,700 acres of National Forest System lands on the Shoshone National Forest, near Cody, Wyoming. An electrical storm occurred in the general vicinity of Blackwater Creek on Wednesday, August 18th causing a fire, which was not...

Author(s): Erle Kauffman

Year Published: 1937

Type: Document

Book or Chapter or Journal Article

Wildfires and WUI fire fatalities

www.nrfirescience.org/resource/21440

Understanding the detailed physical and social context surrounding wildfire and WUI fire fatalities is crucial in terms of ensuring effective emergency management policy and practice. Studies of fatalities over prolonged periods ensure changing trends in vulnerabilities and exposure are identified (e.g., Haynes et al. 2010; Molina...

Author(s): Katharine Haynes, Karen C. Short, Gavriil Xanthopoulos, Domingos Xavier Viegas, Luís M. Ribeiro, Raphaelle M. Blanchi

Type: Document

Book or Chapter or Journal Article