

### **Optimum Sensors Allocation for a Forest Fires Monitoring System**

[www.nrfirescience.org/resource/23106](http://www.nrfirescience.org/resource/23106)

Every year forest fires destroy millions of hectares of land worldwide. Detecting forest fire ignition in the early stages is fundamental to avoid forest fires catastrophes. In this approach, Wireless Sensor Network is explored to develop a monitoring system to send alert to authorities when a fire ignition is detected. The study of...

Author(s): Beatriz Azevedo, Thadeu Brito, José Lima, Ana Pereira

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

### **A qualitative study on the US Forest Service's risk management assistance efforts to improve wildfire decision-making**

[www.nrfirescience.org/resource/22940](http://www.nrfirescience.org/resource/22940)

To support improved wildfire incident decision-making, in 2017 the US Forest Service (Forest Service) implemented risk-informed tools and processes, together known as Risk Management Assistance (RMA). The Forest Service is developing tools such as RMA to improve wildfire decision-making and implements these tools in complex...

Author(s): Courtney Schultz, Lauren Miller, S. Michelle Greiner, Chad Kooistra

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

### **The Human Dimensions of Spatial, Pre-Wildfire Planning Decision Support Systems: A Review of Barriers, Facilitators, and Recommendations**

[www.nrfirescience.org/resource/23101](http://www.nrfirescience.org/resource/23101)

Decision support systems (DSSs) are increasingly common in forest and wildfire planning and management in the United States. Recent policy direction and frameworks call for collaborative assessment of wildfire risk to inform fuels treatment prioritization using the best available science. There are numerous DSSs applicable to forest...

Author(s): Melanie M. Colavito

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

### **Fire Suppression Resource Scarcity: Current Metrics and Future Performance Indicators**

[www.nrfirescience.org/resource/20805](http://www.nrfirescience.org/resource/20805)

Wildland fire occurrence is highly variable in time and space, and in the United States where total area burned can vary substantially, acquiring resources (firefighters, engines, aircraft, etc.) to respond to fire demand is an important consideration. To determine the composition and scale of this set of suppression resources...

Author(s): Erin J. Belval, Crystal S. Stonesifer, David E. Calkin

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

### **Experimental study of leader-and-follower behaviours during emergency evacuation**

[www.nrfirescience.org/resource/22165](http://www.nrfirescience.org/resource/22165)

Leader-and-follower behaviour is one of the most important behaviours during evacuation, as determining the effect of leader-and-follower behaviour in social networks on crowd evacuation during emergency situations is important for enhancing safety. In this study, four experiments with two social

groups involving 81 participants...  
Author(s): Ning Ding, Chang Sun  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

### **A Geospatial Framework to Assess Fireline Effectiveness for Large Wildfires in the Western USA**

[www.nrfirescience.org/resource/21767](http://www.nrfirescience.org/resource/21767)

Quantifying fireline effectiveness (FLE) is essential to evaluate the efficiency of large wildfire management strategies to foster institutional learning and improvement in fire management organizations. FLE performance metrics for incident-level evaluation have been developed and applied to a small set of wildfires, but there is a...

Author(s): Benjamin Gannon, Matthew P. Thompson, Kira Z. Deming, Jude Bayham, Yu Wei, Christopher D. O'Connor  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

### **Forging, protecting, and repairing community resilience informed by the 2019-2020 Australian bushfires**

[www.nrfirescience.org/resource/21172](http://www.nrfirescience.org/resource/21172)

Natural disasters are inherently traumatic. The unexpected, unpredictable, threatening, and overwhelming nature of these events can be destabilising and distressing, potentially leading to psychological trauma (Substance Abuse & Mental Health Services Administration, 2014). Psychological trauma encompasses how people respond to...

Author(s): Sancia West, Denis C. Visentin, Amanda Neil, Grad Dip, Rachel Kornhaber, Valerie Ingham, Michelle Cleary  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

### **Exploring the 'issue-attention cycle': does length of time since wildfire predict social acceptability of prescribed burning?**

[www.nrfirescience.org/resource/21148](http://www.nrfirescience.org/resource/21148)

Social acceptability of environmental management actions, such as prescribed burning used to reduce wildfire risk, is critical to achieving positive outcomes. However, environmental managers often need to implement strategies over a long time period, and sustaining long-term community support can be challenging. Public attention to...

Author(s): Melinda R. Mylek, Jacki Schirmer  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

### **Organizational learning from prescribed fire escapes: a review of developments over the last 10 years in the USA and Australia**

[www.nrfirescience.org/resource/20888](http://www.nrfirescience.org/resource/20888)

Purpose of Review: Prescribed fire escapes continue to challenge most fire and land management agencies and many communities. This article considers the issue from knowledge management (KM) and organizational learning (OL) perspectives. We review organizational initiatives and the literature that have developed over the last 10...

Author(s): Anne E. Black, P. Hayes, R. Strickland  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

**The role of collaborative research in learning to incorporate values of the public in social–ecological system governance: case study of bushfire risk planning**

[www.nrfirescience.org/resource/22408](http://www.nrfirescience.org/resource/22408)

Values of the public are a key and dynamic component of bushfire governance SES. Learning to work with these values is a significant challenge for government and environmental managers and an important aspect of policy transition in many contexts. During such transitions, collaborative research can play a key role in social learning...

Author(s): Kathryn J. Williams, Rebecca M. Ford, Andrea Rawluk  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

**Effects of policy change on wildland fire management strategies: evidence for a paradigm shift in the western US?**

[www.nrfirescience.org/resource/22049](http://www.nrfirescience.org/resource/22049)

In 2009, new guidance for wildland fire management in the United States expanded the range of strategic options for managers working to reduce the threat of high-severity wildland fire, improve forest health and respond to a changing climate. Markedly, the new guidance provided greater flexibility to manage wildland fires to meet...

Author(s): Jesse Young, Alexander M. Evans, Jose M. Iniguez, Andrea E. Thode, Marc D. Meyer, Shaula J. Hedwall, Sarah M. McCaffrey, Patrick Shin, Ching-Hsun Huang  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

**Bridging the research-management gap: landscape science in practice on public lands in the western United States**

[www.nrfirescience.org/resource/21211](http://www.nrfirescience.org/resource/21211)

Context: Landscape science relies on foundational concepts of landscape ecology and seeks to understand the physical, biological, and human components of ecosystems to support land management decision-making. Incorporating landscape science into land management decisions, however, remains challenging. Many lands in the western...

Author(s): Sarah Carter, David S. Pilliod, Travis Haby, Karen L. Prentice, Cameron L. Aldridge, Patrick J. Anderson, Z.H. Bowen, John Bradford, Samuel A. Cushman, Joseph C. DeVivo, Michael C. Duniway, Ryan S. Hathaway, Lisa Nelson, Courtney Schultz, Rudy M. Schuster, E. Jamie Trammell  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

**Probability-based wildfire risk measure for decision-making**

[www.nrfirescience.org/resource/21158](http://www.nrfirescience.org/resource/21158)

Wildfire is a natural element of many ecosystems as well as a natural disaster to be prevented. Climate and land usage changes have increased the number and size of wildfires in the last few decades. In this situation, governments must be able to manage wildfire, and a risk measure can be crucial to evaluate any preventive action...

Author(s): Adán Rodríguez-Martínez, Begoña Vitoriano

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

### **Understanding acceptability of fuel management to reduce wildfire risk: informing communication through understanding complexity of thinking**

[www.nrfirescience.org/resource/21147](http://www.nrfirescience.org/resource/21147)

Understanding the social acceptability of managing forest fuels to reduce wildfire risk is essential to achieving long-term investment in fuel management that is supported publicly and politically. Integrative Complexity Theory (ICT) examines how people think about complex issues, and provides a way to better understand...

Author(s): Melinda R. Mylek, Jacki Schirmer

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](http://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, Lynneth A. Stuart-Hill, Wande Abimbola, J. Patrick Neary, Olave E. Krigolson

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

### **Perception and management of sociopolitical risks on large fires**

[www.nrfirescience.org/resource/19086](http://www.nrfirescience.org/resource/19086)

This work examines the perceived impact of sociopolitical factors on large fire decision making. The study is based on a set of 74 large fires in USDA Forest Service Regions 5 and 6 for the years 2009-2013. All participants were fire managers, some as part of units affected by incidents and others associated with incident management...

Author(s): Armando Gonzalez-Caban, Donald G. MacGregor

Year Published: 2019

Type: Document

Conference Proceedings

### **Risk management and analytics in wildfire response**

[www.nrfirescience.org/resource/20612](http://www.nrfirescience.org/resource/20612)

Purpose of Review: The objectives of this paper are to briefly review basic risk management and analytics concepts, describe their nexus in relation to wildfire response, demonstrate real-world application of analytics to support response decisions and organizational learning, and outline an analytics strategy for the future....

Author(s): Matthew P. Thompson, Yu Wei, David E. Calkin, Christopher D. O'Connor, Christopher J. Dunn, Nathaniel M. Anderson, John S. Hogland

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Understanding the leadership perspective in wildland firefighting: gaps and opportunities for growth**

[www.nrfirescience.org/resource/18911](http://www.nrfirescience.org/resource/18911)

The aim of this study was to develop and assess the viability of a leadership scale that measures leadership from the perspective of the leader. A criterion sample was used of firefighters across USA federal land management agencies who are qualified crew bosses. The Supervisor Perceived Leadership Scale (SPLS) consists of...

Author(s): Alexis L. Waldron, David P. Schary

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **After the Fort McMurray wildfire there are significant increases in mental health symptoms in grade 7-12 students compared to controls**

[www.nrfirescience.org/resource/20572](http://www.nrfirescience.org/resource/20572)

Background: In order to examine the impact of disasters on adolescent mental health, this study compared population mental health survey data from two communities in Alberta, Canada: Fort McMurray, which experienced a major natural disaster, and Red Deer, which did not. Methods: Data from 3070 grade 7-12 students from Fort McMurray...

Author(s): Matthew R. G. Brown, Vincent I. O. Agyapong, Andrew J. Greenshaw, Ivor Cribben, Pamela Brett-MacLean, Julie Drolet, Caroline McDonald-Harker, Joy Omeje, Monica Mankowski, Shannon Noble, Deborah Kitching, Peter H. Silverstone

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Group Resilience: The Place and Meaning of Relational Pauses**

[www.nrfirescience.org/resource/21265](http://www.nrfirescience.org/resource/21265)

Recent scholarship on resilience has shed light on the processes by which organizations absorb strain and maintain functioning in the face of adversity. These theories, however, often focus on the operational impacts of adversity without accounting for the strain it puts on organizational members and their abilities to work...

Author(s): Michelle Barton, William A. Kahn

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Impacts of wildland fire effects on resources and assets through expert elicitation to support fire response decisions**

[www.nrfirescience.org/resource/20375](http://www.nrfirescience.org/resource/20375)

A modelling framework to spatially score the impacts from wildland fire effects on specific resources and assets was developed for and applied to the province of Ontario, Canada. This impact model represents the potential 'loss', which can be used in the different decision-making methods common in fire response operations (e.g....

Author(s): Colin B. McFayden, Den Boychuk, Douglas G. Woolford, Melanie J. Wheatley, Lynn Johnston

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Mapping combined wildfire and heat stress hazards to improve evidence-based decision making**

[www.nrfirescience.org/resource/19826](http://www.nrfirescience.org/resource/19826)

Heat stress and forest fires are often considered highly correlated hazards as extreme temperatures play a key role in both occurrences. This commonality can influence how civil protection and local responders deploy resources on the ground and could lead to an underestimation of potential impacts, as people could be less resilient...

Author(s): Claudia Vitolo, Claudia Di Napoli, Francesca Di Giuseppe, Hannah L. Cloke, Florian Pappenberger

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Emergency logistics for wildfire suppression based on forecasted disaster evolution**

[www.nrfirescience.org/resource/20616](http://www.nrfirescience.org/resource/20616)

This paper aims to develop a two-layer emergency logistics system with a single depot and multiple demand sites for wildfire suppression and disaster relief. For the first layer, a fire propagation model is first built using both the flame-igniting attributes of wildfires and the factors affecting wildfire propagation and patterns....

Author(s): Zhongzhen Yang, Liquan Guo, Zaili Yang

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **A modelling framework for householder decision-making for wildfire emergencies**

[www.nrfirescience.org/resource/20592](http://www.nrfirescience.org/resource/20592)

The occurrence of wildfire threats has increased in the last few decades creating serious challenges for thousands of communities around the world. Understanding the physical and social dynamics imposed by wildfires is fundamental to assessing and reducing the ensuing risk to different communities.

Although, several studies...

Author(s): Ruggiero Lovreglio, Erica D. Kuligowski, Steven M. V. Gwynne, Ken Strahan

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Emotional and social intelligence competencies in incident command**

[www.nrfirescience.org/resource/20537](http://www.nrfirescience.org/resource/20537)

As a leader of a diverse set of formal and informal teams, the successful IC needs to be able to play a number of roles at different points in time—as executive, as innovator, as teacher, and as pastor. The IC supervises and directs a variety of specialists drawn from a variety of organizations— Federal, State, local, and/or...

Author(s): Anne E. Black, R. E. Boyatzis, K. Thiel, K. Rochford

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Cross-boundary cooperation for landscape management: collective action and social exchange among individual private forest landowners**

[www.nrfirescience.org/resource/20011](http://www.nrfirescience.org/resource/20011)

The landscape is an ideal spatial extent for managing forests because many ecological processes and disturbances occur on such scales. Moreover, landscape-level decision-making processes can improve the efficiency of forest management, as when many owners of small parcels increase the economy of

scale of their operations by jointly...

Author(s): A. Paige Fischer, Andrew Klooster, Lora Cirhigiri

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Fire regime and ecosystem responses: adaptive forest management in a changing world (Part 2)**

[www.nrfirescience.org/resource/19869](http://www.nrfirescience.org/resource/19869)

Fire is an ecological factor in ecosystems around the world, made increasingly more critical by unprecedented shifts in climate and human population pressure. The knowledge gradually acquired on the subject is needed to improve fire behaviour understanding and to enhance fire management decision-making. This issue (Volume 28, issue...

Author(s): Daniel Moya, Giacomo Certini, Peter Z. Fule

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **How stakeholders structure their collaborations to anticipate and tackle the threat of mountain pine beetle in the Jasper–Hinton (Alberta, Canada) area**

[www.nrfirescience.org/resource/19628](http://www.nrfirescience.org/resource/19628)

The resilience of resource-based communities facing natural disturbances partly depends on the capacity of a wide diversity of stakeholders to share their expertise, articulate their efforts, and develop solutions that are both effective and equitable. Structural methods from network theory can be used to measure how efficiently and...

Author(s): Rodolphe Gonzalès, Lael Parrott

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Modeling individual and group evacuation decisions during wildfires**

[www.nrfirescience.org/resource/19371](http://www.nrfirescience.org/resource/19371)

Quantifying factors that affect evacuation decision making remains a challenging task. Progress is crucial for developing predictive models of collective behavior and for designing effective policies to guide the action of populations during wildfires. We conduct a controlled behavioral experiment to probe factors influencing...

Author(s): Chantal Nguyen, Kimberly J. Schlesinger, Fangqiu Han, Izzeddin Gür, Jean M. Carlson

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **Wildfire risk reduction in the United States: Leadership staff perceptions of local fire department roles and responsibilities**

[www.nrfirescience.org/resource/16481](http://www.nrfirescience.org/resource/16481)

As wildland fires have had increasing negative impacts on a range of human values, in many parts of the United States (U.S.) and around the world, collaborative risk reduction efforts among agencies, homeowners, and fire departments are needed to improve wildfire safety and mitigate risk. Using interview data from 46 senior officers...

Author(s): Rachel S. Madsen, Hylton J. G. Haynes, Sarah M. McCaffrey

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **An attacker-defender model for analyzing the vulnerability of initial attack in wildfire suppression**

[www.nrfirescience.org/resource/17925](http://www.nrfirescience.org/resource/17925)

Wildfire managers use initial attack (IA) to control wildfires before they grow large and become difficult to suppress. Although the majority of wildfire incidents are contained by IA, the small percentage of fires that escape IA causes most of the damage. Therefore, planning a successful IA is very important. In this article, we...

Author(s): Eghbal Rashidi, Hugh R. Medal, Aaron Hoskins

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Recognizing Women Leaders in Fire Science: Revisited**

[www.nrfirescience.org/resource/18759](http://www.nrfirescience.org/resource/18759)

In August, 2018, an editorial in Fire entitled Recognizing Women Leaders in Fire Science was published. This was intended to ignite a conversation into diversity in fire science by highlighting several women leaders in fire research and development. This editorial was released alongside a new Topical Collection in Fire called...

Author(s): Alistair M. S. Smith, Eva K. Strand

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Spatial optimization of operationally relevant large fire confine and point protection strategies: Model development and test cases**

[www.nrfirescience.org/resource/17539](http://www.nrfirescience.org/resource/17539)

This study introduces a large fire containment strategy that builds upon recent advances in spatial fire planning, notably the concept of potential wildland fire operation delineations (PODs). Multiple PODs can be clustered together to form a "box" that is referred as the "response POD" (or rPOD). Fire lines would be built...

Author(s): Yu Wei, Matthew P. Thompson, Jessica R. Haas, Gregory K. Dillon, Christopher D. O'Connor

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Integrating Fire and Forest Planning: A Review of National Forest Plan Revisions**

[www.nrfirescience.org/resource/18142](http://www.nrfirescience.org/resource/18142)

The purpose of this thesis is to determine how wildland fire and forest planning are integrated during forest plan revisions. Specifically, three overarching questions are answered: 1) what is the decision-making framework used in fire and forest planning?, 2) how are National Forests planning for wildland fire management?, and 3)...

Author(s): Hailey Graf

Year Published: 2018

Type: Document

Dissertation or Thesis

### **Lolo Peak Fire 2017: From the wilderness to the wildland urban interface**

[www.nrfirescience.org/resource/19554](http://www.nrfirescience.org/resource/19554)



The lightning-ignited Lolo Peak fire in the Selway-Bitterroot Wilderness was discovered on July 12, 2017, burning in an area of high tree mortality and rugged terrain. During the field trip, which was held as part of the May 2018 Fire Continuum Conference, managers, scientists, a county sheriff, and a property owner guided 41...

Author(s): Linda Mutch

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

### **Wildland fire radio communication -common myths and best practices**

[www.nrfirescience.org/resource/18958](http://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

### **Wildland firefighters and suicide risk: examining the role of social disconnectedness**

[www.nrfirescience.org/resource/17881](http://www.nrfirescience.org/resource/17881)

Recent research has indicated that firefighters are at elevated suicide risk. Fire service organizations have called for research to examine fire service subgroups that might be at relatively increased suicide risk. Although anecdotal reports suggest that wildland firefighters represent one such group, to our knowledge, no study has...

Author(s): Ian H. Stanley, Melanie A. Hom, Anna R. Gai, Thomas E. Joiner

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Blueprint for wildland fire science in Canada (2019-2029)**

[www.nrfirescience.org/resource/18910](http://www.nrfirescience.org/resource/18910)

The capacity of wildland fire science and technology in Canada is not keeping pace with the growing complexity of wildland fire. Fire seasons are becoming longer, fire events are becoming more severe, and experts predict that the area burned on an annual basis could double by the end of this century.

However, wildfire research...

Year Published: 2018

Type: Document

Technical Report or White Paper

### **Everyone goes home in the wildland**

[www.nrfirescience.org/resource/18857](http://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

### **Rethinking the wildland fire management system**

[www.nrfirescience.org/resource/17822](http://www.nrfirescience.org/resource/17822)

In the western United States and elsewhere, the need to change society's relationship with wildfire is well-recognized. Suppressing fewer fires in fire-prone systems is promoted to escape existing feedback loops that lead to ever worsening conditions and increasing risks to responders and communities. Our primary focus is how to...

Author(s): Matthew P. Thompson, Donald G. MacGregor, Christopher J. Dunn, David E. Calkin, John Phipps

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **The wildfire within: gender, leadership and wildland fire culture**

[www.nrfirescience.org/resource/18450](http://www.nrfirescience.org/resource/18450)

This article examines findings from a 2016 study on gender and leadership within the British Columbia Wildfire Service (BCWS), Canada. The study utilised action research to facilitate an in-depth conversation among wildland firefighters about gender and leadership, and to explore participant-derived actions steps within the BCWS...

Author(s): Rachel Reimer, Christine Eriksen

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Is organizational learning being absorbed by knowledge management? A systematic review**

[www.nrfirescience.org/resource/18238](http://www.nrfirescience.org/resource/18238)

Purpose – This paper aims to focus on research regarding organizational learning (OL) and knowledge management (KM), and to specifically investigate whether OL has been conceptually absorbed by KM. Design/methodology/approach – This study is based on 16,185 articles from the Scopus and ISI Web of Science databases, using...

Author(s): Delio Ignacio Castaneda, Luisa Fernanda Manrique, Sergio Cuellar

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Assessing influences on social vulnerability to wildfire using surveys, spatial data and wildfire simulations**

[www.nrfirescience.org/resource/17422](http://www.nrfirescience.org/resource/17422)

A growing body of research focuses on identifying patterns among human populations most at risk from hazards such as wildfire and the factors that help explain performance of mitigations that can help reduce that risk. Emerging policy surrounding wildfire management emphasizes the need to better understand such social vulnerability-...

Author(s): Travis B. Paveglio, Catrin Edgeley, Amanda M. Stasiewicz

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **Recognizing Women Leaders in Fire Science**

[www.nrfirescience.org/resource/18070](http://www.nrfirescience.org/resource/18070)

Across the breadth of fire science disciplines, women are leaders in fire research and development. We want to acknowledge some of these leaders to promote diversity across our disciplines. In Fire, we are

also happy to announce a new Special Collection, through which we will continue to acknowledge current and future Diversity...

Author(s): Alistair M. S. Smith, Crystal A. Kolden, Susan J. Prichard, Robert W. Gray, Paul F. Hessburg, Jennifer Balch

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **A review of the challenges to determining and demonstrating efficiency of large fire management**

[www.nrfirescience.org/resource/15488](http://www.nrfirescience.org/resource/15488)

Characterising the impacts of wildland fire and fire suppression is critical information for fire management decision-making. Here, we focus on decisions related to the rare larger and longer-duration fire events, where the scope and scale of decision-making can be far broader than initial response efforts, and where determining and...

Author(s): Matthew P. Thompson, Francisco Rodriguez y Silva, David E. Calkin, Michael S. Hand

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Systems thinking and wildland fire management**

[www.nrfirescience.org/resource/16148](http://www.nrfirescience.org/resource/16148)

A changing climate, changing development and land use patterns, and increasing pressures on ecosystem services raise global concerns over growing losses associated with wildland fires. New management paradigms acknowledge that fire is inevitable and often uncontrollable, and focus on living with fire rather than attempting to...

Author(s): Matthew P. Thompson, Christopher J. Dunn, David E. Calkin

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Twisp River operational and organizational learning report**

[www.nrfirescience.org/resource/17831](http://www.nrfirescience.org/resource/17831)

This report highlights how leadership has been proactively addressing safety issues, specifically, how the Safety Engagement sessions and Life First dialogues have already begun to address many of the systemic weaknesses that have been identified up to this point during the Twisp River Learning Review process. Recommendations are...

Author(s): United States Department of Agriculture

Year Published: 2017

Type: Document

Technical Report or White Paper

### **Sustainability and wildland fire: The origins of Forest Service Wildland Fire Research**

[www.nrfirescience.org/resource/15768](http://www.nrfirescience.org/resource/15768)

On June 1, 2015, the Forest Service, an agency of the U.S. Department of Agriculture (USDA), celebrated the 100th anniversary of the Branch of Research. Established in 1915 to centralize and elevate the pursuit of research throughout the agency, the Branch of Research focused on everything from silvicultural investigations conducted...

Author(s): Diane M. Smith

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **A review of challenges to determining and demonstrating efficiency of large fire management**

[www.nrfirescience.org/resource/16145](http://www.nrfirescience.org/resource/16145)

Characterizing the impacts of wildland fire and fire suppression is critical information for fire management decision-making. Here, we focus on decisions related to the rare larger and longer-duration fire events, where the scope and scale of decision-making can be far broader than initial response efforts, and where determining and...

Author(s): Matthew P. Thompson, Francisco Rodriguez y Silva, David E. Calkin, Michael S. Hand

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Studying interregional wildland fire engine assignments for large fire suppression**

[www.nrfirescience.org/resource/15497](http://www.nrfirescience.org/resource/15497)

One crucial component of large fire response in the United States (US) is the sharing of wildland firefighting resources between regions: resources from regions experiencing low fire activity supplement resources in regions experiencing high fire activity. An important step towards improving the efficiency of resource sharing and...

Author(s): Erin J. Belval, Yu Wei, David E. Calkin, Crystal S. Stonesifer, Matthew P. Thompson, John R. Tipton

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Characterising resource use and potential inefficiencies during large-fire suppression in the western US**

[www.nrfirescience.org/resource/15492](http://www.nrfirescience.org/resource/15492)

Currently, limited research on large-fire suppression effectiveness suggests fire managers may over-allocate resources relative to values to be protected. Coupled with observations that weather may be more important than resource abundance to achieve control objectives, resource use may be driven more by risk aversion than...

Author(s): Hari Katuwal, Christopher J. Dunn, David E. Calkin

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Lolo Peak Fire Tree-Strike Fatality Organizational Learning Report**

[www.nrfirescience.org/resource/18113](http://www.nrfirescience.org/resource/18113)

Within the Forest Service, we hold safety as the top priority. Fatality incidents are brutal reminders of what is at stake. To ensure we are performing at our best and in the safest way possible, it is necessary that all levels of the organization learn from accidents. In reviewing the Lolo Peak Fire Tree-Strike Fatality, it has...

Year Published: 2017

Type: Document

Technical Report or White Paper

### **Uncertainty and probability in wildfire management decision support: An example from the United States [Chapter 4]**

[www.nrfirescience.org/resource/14998](http://www.nrfirescience.org/resource/14998)

Wildfire risk assessment is increasingly being adopted to support federal wildfire management decisions in the United States. Existing decision support systems, specifically the Wildland Fire Decision Support System (WFDSS), provide a rich set of probabilistic and risk-based information to support the management of active wildfire...

Author(s): Matthew P. Thompson, David E. Calkin, Joe H. Scott, Michael S. Hand

Year Published: 2017

Type: Document

Technical Report or White Paper

### **An empirical machine learning method for predicting potential fire control locations for pre-fire planning and operational fire management**

[www.nrfirescience.org/resource/15490](http://www.nrfirescience.org/resource/15490)

During active fire incidents, decisions regarding where and how to safely and effectively deploy resources to meet management objectives are often made under rapidly evolving conditions, with limited time to assess management strategies or for development of backup plans if initial efforts prove unsuccessful. Under all but the most...

Author(s): Christopher D. O'Connor, David E. Calkin, Matthew P. Thompson

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](http://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

### **Towards enhanced risk management: planning, decision making and monitoring of US wildfire response**

[www.nrfirescience.org/resource/15485](http://www.nrfirescience.org/resource/15485)

This paper is the preface to a special issue focused on US wildfire response. The nine papers included build from a 2016 conference special session on monitoring, modelling and accountability of fire management policies and practices. Here we provide the unifying theme for these papers, summarise each from this perspective, and...

Author(s): Christopher J. Dunn, David E. Calkin, Matthew P. Thompson

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Uncertainty in natural hazards: modeling and decision support (Introduction)**

[www.nrfirescience.org/resource/16149](http://www.nrfirescience.org/resource/16149)

Uncertainties are pervasive in natural hazards, and it is crucial to develop robust and meaningful approaches to characterize and communicate uncertainties to inform modeling efforts. In this monograph we provide a broad, cross-disciplinary overview of issues relating to uncertainties faced in natural hazard and risk assessment. We...

Author(s): Karen L. Riley, Matthew P. Thompson, Peter Webley, Kevin D. Hyde  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

### **Natural hazard modeling and uncertainty analysis (Chapter 2)**

[www.nrfirescience.org/resource/16147](http://www.nrfirescience.org/resource/16147)

Modeling can play a critical role in assessing and mitigating risks posed by natural hazards. These modeling efforts generally aim to characterize the occurrence, intensity, and potential consequences of natural hazards. Uncertainties surrounding the modeling process can have important implications for the development, application,...

Author(s): Matthew P. Thompson, Jord J. Warmink  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

### **A framework for developing safe and effective large-fire response in a new fire management paradigm**

[www.nrfirescience.org/resource/16144](http://www.nrfirescience.org/resource/16144)

The impacts of wildfires have increased in recent decades because of historical forest and fire management, a rapidly changing climate, and an increasingly populated wildland urban interface. This increasingly complex fire environment highlights the importance of developing robust tools to support risk-informed decision making....

Author(s): Christopher J. Dunn, Matthew P. Thompson, David E. Calkin  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

### **Becoming Authentic: The Heart of Leadership in Wildland Fire Management**

[www.nrfirescience.org/resource/17548](http://www.nrfirescience.org/resource/17548)

The wildland fire environment is entering a new age of complexity in terms of not only the biophysical fire environment but also the social environment. More and more attention is being paid to the human side of fire and the role that leadership plays in the performance, safety, and well-being of firefighters. In the early 2000s,...

Author(s): Alexis L. Waldron, Mike Alarid  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

### **A simulation and optimisation procedure to model daily suppression resource transfers during a fire season in Colorado**

[www.nrfirescience.org/resource/15495](http://www.nrfirescience.org/resource/15495)

Sharing fire engines and crews between fire suppression dispatch zones may help improve the utilisation of fire suppression resources. Using the Resource Ordering and Status System, the Predictive Services' Fire Potential Outlooks and the Rocky Mountain Region Preparedness Levels from 2010 to 2013, we tested a simulation and...

Author(s): Yu Wei, Erin J. Belval, Matthew P. Thompson, David E. Calkin, Crystal S. Stonesifer  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

### **Strawberry Fire Fatality**

[www.nrfirescience.org/resource/18115](http://www.nrfirescience.org/resource/18115)

This report examines the Strawberry Fire fatality of Justin Beebe and events surrounding the movement of EMTs to his position.

Author(s): Randy Draeger

Year Published: 2017

Type: Document

Technical Report or White Paper

### **Federal fire managers' perceptions of the importance, scarcity and substitutability of suppression resources**

[www.nrfirescience.org/resource/15491](http://www.nrfirescience.org/resource/15491)

Wildland firefighting in the United States is a complex and costly enterprise. While there are strong seasonal signatures for fire occurrence in specific regions of the United States, spatiotemporal occurrence of wildfire activity can have high inter-annual variability. Suppression resources come from a variety of jurisdictions and...

Author(s): Crystal S. Stonesifer, David E. Calkin, Michael S. Hand

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Bridging the divide between fire safety research and fighting fire safely: how do we convey research innovation to contribute more effectively to wildland firefighter safety?**

[www.nrfirescience.org/resource/14936](http://www.nrfirescience.org/resource/14936)

Creating a safe workplace for wildland firefighters has long been at the centre of discussion for researchers and practitioners. The goal of wildland fire safety research has been to protect operational firefighters, yet its contributions often fall short of potential because much is getting lost in the translation of peer-reviewed...

Author(s): Theodore Adams, Bret W. Butler, Sara Brown, Vita Wright, Anne E. Black

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Telling fire's story through narrative and art**

[www.nrfirescience.org/resource/17029](http://www.nrfirescience.org/resource/17029)

Modern works by highly skilled narrative authors and artists have become increasingly useful for telling the story of wildland fire in the United States. Using unconventional means—and with partial funding by the Joint Fire Science Program—creative individuals have spawned some colorful and heartfelt messages that convey...

Author(s): Stephen W. Barrett

Year Published: 2017

Type: Document

Research Brief or Fact Sheet

### **Outcomes of fire research: is science used?**

[www.nrfirescience.org/resource/14369](http://www.nrfirescience.org/resource/14369)

An assessment of outcomes from research projects funded by the Joint Fire Science Program was conducted to determine whether or not science has been used to inform management and policy decisions and to explore factors that facilitate use of fire science. In a web survey and follow-up phone interviews, I asked boundary spanners and...

Author(s): Molly E. Hunter  
Year Published: 2016  
Type: Document  
Book or Chapter or Journal Article

### **Uncertainty is information, too**

[www.nrfirescience.org/resource/16151](http://www.nrfirescience.org/resource/16151)

How accounting for doubt helps inform decision making.

Author(s): Bruce G. Marcot, Matthew P. Thompson, Thomas W. Bonnot, Frank R. Thompson

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Twisp River weather and fire behavior supplement report**

[www.nrfirescience.org/resource/17835](http://www.nrfirescience.org/resource/17835)

Provides a detailed weather report throughout the Twisp River Fire.

Author(s): Ronald Miller, Robert Tobin, Bret W. Butler, Charles W. McHugh

Year Published: 2016

Type: Document

Technical Report or White Paper

### **Adapting Safety Rules in a High Reliability Context: How Wildland Firefighting Workgroups Ventriloquize Safety Rules to Understand Hazards**

[www.nrfirescience.org/resource/19934](http://www.nrfirescience.org/resource/19934)

Safety rules are unavoidable in hazardous work and are often codified insights from accidents and fatalities. Safety rules research predominantly focuses on factors that influence compliance and violation of rules (a rationalist view), but rarely examines how members draw from safety rules to take action and gain experience. This...

Author(s): Jody L. Jahn

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Getting ahead of the wildfire problem: quantifying and mapping management challenges and opportunities**

[www.nrfirescience.org/resource/14688](http://www.nrfirescience.org/resource/14688)

Wildfire is a global phenomenon that plays a vital role in regulating and maintaining many natural and human-influenced ecosystems but that also poses considerable risks to human populations and infrastructure. Fire managers are charged with balancing the short-term protection of human assets sensitive to fire exposure against the...

Author(s): Christopher D. O'Connor, Matthew P. Thompson, Francisco Rodriguez y Silva

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Butte Fire Staff Ride - Preliminary Study**

[www.nrfirescience.org/resource/18001](http://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

### **Twisp River Final Learning Review Narrative**

[www.nrfirescience.org/resource/17832](http://www.nrfirescience.org/resource/17832)

This expanded narrative adds to and builds on the Twisp River Status Report. It was written by a 25-member interagency team who visited the incident site, interviewed participants, reviewed official documents, and used this information to recreate the August 19, 2015 events to the best of their abilities. Once the first draft of the...

Author(s): United States Department of Agriculture  
Year Published: 2016  
Type: Document  
Technical Report or White Paper

### **Risk perception, sense-making and resilient performance: the sounds of wildland firefighting in action - Final Report to the Joint Fire Science Program**

[www.nrfirescience.org/resource/15572](http://www.nrfirescience.org/resource/15572)

Managing wildland fire is an exercise in risk perception, sensemaking and resilient performance. Risk perception begins with individual size up of a wildfire to determine a course of action, and then becomes collective as the fire management team builds and continuously updates their common perception of risk. Karl Weick has called...

Author(s): Anne E. Black, David Thomas, J. Ziegler, Elena Gabor, Rebekah L. Fox  
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](http://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

### **Measuring wildland fire leadership: the crewmember perceived leadership scale**

[www.nrfirescience.org/resource/13705](http://www.nrfirescience.org/resource/13705)

The aims of this research were to develop and test a scale used to measure leadership in wildland firefighting using two samples of USA wildland firefighters. The first collection of data occurred in the spring and early summer and consisted of an online survey. The second set of data was collected towards late summer and early fall...

Author(s): Alexis L. Waldron, David P. Schary, Bradley J. Cardinal  
Year Published: 2015  
Type: Document  
Book or Chapter or Journal Article

### **The ecological importance of mixed-severity fire: nature's phoenix**

[www.nrfirescience.org/resource/16303](http://www.nrfirescience.org/resource/16303)

If you are a curious reader with a knack for the analytical, you may be asking yourself, Why start a book about fire ecology with a mythological figure? And if you are a tried-and-true scientist, like we are, you may also be asking, Isn't it a bit risky to mix myth with science, fact with fiction, observation with mystique, nature...

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **A mixed integer program to model spatial wildfire behavior and suppression placement decisions**

[www.nrfirescience.org/resource/13272](http://www.nrfirescience.org/resource/13272)

Wildfire suppression combines multiple objectives and dynamic fire behavior to form a complex problem for decision makers. This paper presents a mixed integer program designed to explore integrating spatial fire behavior and suppression placement decisions into a mathematical programming framework. Fire behavior and suppression...

Author(s): Erin J. Belval, Yu Wei, Michael Bevers

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **Voices from the field: wildland fire managers and high-reliability organizing mindfulness**

[www.nrfirescience.org/resource/12892](http://www.nrfirescience.org/resource/12892)

Wildland fire management agencies manage wildland fires for resource benefit while protecting firefighter and public safety. Firefighting fatalities and property damaged by wildfires prompt reviews aimed at preventing similar accidents. The principles of high-reliability organizing (HRO) have been used to analyze such unexpected,...

Author(s): David Thomas, Rebekah L. Fox, Carol Miller

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **Decision making under uncertainty: recommendations for the Wildland Fire Decision Support System (WFDSS)**

[www.nrfirescience.org/resource/13947](http://www.nrfirescience.org/resource/13947)

The management of wildfire is a dynamic, complex, and fundamentally uncertain enterprise. Fire managers face uncertainties regarding fire weather and subsequent influence on fire behavior, the effects of fire on socioeconomic and ecological resources, and the efficacy of alternative suppression actions on fire outcomes. In these...

Author(s): Matthew P. Thompson

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **Wildfires: systemic changes required**

[www.nrfirescience.org/resource/16155](http://www.nrfirescience.org/resource/16155)

There needs to be a deeper, systems-level understanding of the fire management system. The behavior of fire managers is a direct and logical result of the structure of the system in which they

operate, influenced by factors such as incentives, culture, and capacity. If managers are judged by fire exclusion, that will become the...

Author(s): Matthew P. Thompson, Christopher J. Dunn, David E. Calkin

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **The relationship of mindfulness and self-compassion to desired wildland fire leadership**

[www.nrfirescience.org/resource/13268](http://www.nrfirescience.org/resource/13268)

A quantitative approach was adopted to explore facets of mindfulness and self-compassion in relation to their ability to predict crewmembers' perceptions of their supervisors' leadership capabilities. The sample comprised 43 wildland fire crews consisting of their primary supervisors (n = 43) and crewmembers (n = 246). A partial...

Author(s): Alexis L. Waldron, Vicki Ebbeck

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **Development and application of a probabilistic method for wildfire suppression cost modeling**

[www.nrfirescience.org/resource/12762](http://www.nrfirescience.org/resource/12762)

Wildfire activity and escalating suppression costs continue to threaten the financial health of federal land management agencies. In order to minimize and effectively manage the cost of financial risk, agencies need the ability to quantify that risk. A fundamental aim of this research effort, therefore, is to develop a process for...

Author(s): Matthew P. Thompson, Jessica R. Haas, Mark A. Finney, David E. Calkin, Michael S. Hand, Mark J. Browne, Martin Halek, Karen C. Short, Isaac C. Grenfell

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

### **Developing an aviation exposure index to inform risk-based fire management decisions**

[www.nrfirescience.org/resource/16159](http://www.nrfirescience.org/resource/16159)

Wildland firefighting is an inherently dangerous activity, and aviation-related accidents in particular comprise a large share of firefighter fatalities. Due to limited understanding of operational factors that lead to aviation accidents, it is unclear how local decisionmakers, responsible for requesting aviation support, can...

Author(s): Crystal S. Stonesifer, David E. Calkin, Matthew P. Thompson, Jeffrey D. Kaiden

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

### **Social, institutional, and psychological factors wildfire incident decision making**

[www.nrfirescience.org/resource/16136](http://www.nrfirescience.org/resource/16136)

Managing wildland fire incidents can be fraught with complexity and uncertainty. Myriad human factors can exert significant influence on incident decision making, and can contribute additional uncertainty regarding programmatic evaluations of wildfire management and attainment of policy goals. This article develops a framework...

Author(s): Matthew P. Thompson

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

### **Understanding stochastic wildfire simulation results**

[www.nrfirescience.org/resource/12758](http://www.nrfirescience.org/resource/12758)

Stochastic simulations of wildfire occurrence and growth have become an integral part of both wildfire incident management and land management planning applications. The FSPro simulation system, implemented in the online Wildland Fire Decision Support System (WFDSS), acknowledges that weather inputs to wildfire growth...

Author(s): Joe H. Scott

Year Published: 2014

Type: Document

Technical Report or White Paper

### **Economics of wildfire management: the development and application of suppression expenditure models**

[www.nrfirescience.org/resource/16161](http://www.nrfirescience.org/resource/16161)

In the United States, increased wildland fire activity over the last 15 years has resulted in increased pressure to balance the cost, benefits, and risks of wildfire management. Amid increased public scrutiny and a highly variable wildland fire environment, a substantial body of research has developed to study factors affecting the...

Author(s): Michael S. Hand, Krista M. Gebert, Jingjing Liang, David E. Calkin, Matthew P. Thompson, Mo Zhou

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

### **Predicting wildfire ignitions, escapes, and large fire activity using Predictive Service's 7-Day Fire Potential Outlook in the western USA**

[www.nrfirescience.org/resource/13615](http://www.nrfirescience.org/resource/13615)

Can fire potential forecasts assist with pre-positioning of fire suppression resources, which could result in a cost savings to the United States government? Here, we present a preliminary assessment of the 7-Day Fire Potential Outlook forecasts made by the Predictive Services program. We utilized historical fire occurrence data and...

Author(s): Karen L. Riley, Crystal S. Stonesifer, Haiganoush K. Preisler, David E. Calkin

Year Published: 2014

Type: Document

Conference Proceedings

### **Applying resilience thinking - Seven principles for building resilience in social-ecological systems**

[www.nrfirescience.org/resource/13407](http://www.nrfirescience.org/resource/13407)

This publication is a popular summary of the book "Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems", published by Cambridge University Press (2014). This book, in turn, expands on the comprehensive review "Towards principles for enhancing the resilience of..."

Author(s): Stockholm University

Year Published: 2014

Type: Document

Technical Report or White Paper

### **Assessing high reliability practices in wildland fire management: an exploration and**

### **benchmarking of organizational culture**

[www.nrfirescience.org/resource/12444](http://www.nrfirescience.org/resource/12444)

In an effort to improve organizational outcomes, including safety, in wildland fire management, researchers and practitioners have turned to a domain of research on organizational performance known as High Reliability Organizing (HRO). The HRO paradigm emerged in the late 1980s in an effort to identify commonalities among...

Author(s): Anne E. Black, Brooke Baldauf McBride

Year Published: 2013

Type: Document

Research Brief or Fact Sheet

### **Safety climate in the US federal wildland fire management community: influences of organisational, environmental, group and individual characteristics**

[www.nrfirescience.org/resource/12452](http://www.nrfirescience.org/resource/12452)

This study examined the effects of organisational, environmental, group and individual characteristics on five components of safety climate (High Reliability Organising Practices, Leadership, Group Culture, Learning Orientation and Mission Clarity) in the US federal wildland fire management community. Of particular interest were...

Author(s): Anne E. Black, Brooke Baldauf McBride

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

### **Escape probability: an alternative risk metric to support and evaluate wilderness fire management decisions**

[www.nrfirescience.org/resource/13478](http://www.nrfirescience.org/resource/13478)

A goal of fire management in wilderness is to allow fire to play its natural ecological role without intervention. Unfortunately, most unplanned ignitions in wilderness are suppressed, in part because of the risk they might pose to values outside of the wilderness. Although the fire management community has embraced the concept of...

Author(s): Kevin M. Barnett

Year Published: 2013

Type: Document

Dissertation or Thesis

### **Trial by fire: Community Wildfire Protection Plans put to the test**

[www.nrfirescience.org/resource/12430](http://www.nrfirescience.org/resource/12430)

Research has found that community wildfire protection planning can make significant contributions to wildfire mitigation and preparedness, but can the planning process and resulting Community Wildfire Protection Plans make a difference to wildfire response and recovery? In case studies conducted in four USA communities with...

Author(s): Pamela J. Jakes, Victoria Sturtevant

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

### **•Incident Management Organization succession planning stakeholder feedback**

[www.nrfirescience.org/resource/17811](http://www.nrfirescience.org/resource/17811)

This report presents complete results of a 2011 stakeholder feedback effort conducted for the National Wildfire Coordination Group (NWCG) Executive Board concerning how best to organize and manage national wildland fire Incident Management Teams in the future to meet the needs of the public,

agencies, fire service and Team members....

Author(s): Anne E. Black

Year Published: 2013

Type: Document

Technical Report or White Paper

### **A polygon-based modeling approach to assess exposure of resources and assets to wildfire**

[www.nrfirescience.org/resource/12048](http://www.nrfirescience.org/resource/12048)

Spatially explicit burn probability modeling is increasingly applied to assess wildfire risk and inform mitigation strategy development. Burn probabilities are typically expressed on a per-pixel basis, calculated as the number of times a pixel burns divided by the number of simulation iterations. Spatial intersection of highly...

Author(s): Matthew P. Thompson, Joe H. Scott, Jeffrey D. Kaiden, Julie W. Gilbertson-Day

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

### **The science of decision making: applications for sustainable forest and grassland management in the national forest system**

[www.nrfirescience.org/resource/16143](http://www.nrfirescience.org/resource/16143)

Sustainable management of national forests and grasslands within the National Forest System (NFS) often requires managers to make tough decisions under considerable uncertainty, complexity, and potential conflict. Resource decisionmakers must weigh a variety of risks, stressors, and challenges to sustainable management, including...

Author(s): Matthew P. Thompson, Bruce G. Marcot, Frank R. Thompson, Steven G. McNulty, Larry A. Fisher, Michael C. Runge, David Cleaves, Monica S. Tomosy

Year Published: 2013

Type: Document

Technical Report or White Paper

### **Decision making for wildfires: a guide for applying a risk management process at the incident level**

[www.nrfirescience.org/resource/12748](http://www.nrfirescience.org/resource/12748)

This publication focuses on the thought processes and considerations surrounding a risk management process for decision making on wildfires. The publication introduces a six element risk management cycle designed to encourage sound risk-informed decision making in accordance with Federal wildland fire policy, although the process is...

Author(s): Mary A. Taber, Lisa M. Elenz, Paul G. Langowski

Year Published: 2013

Type: Document

Technical Report or White Paper

### **Wildland firefighter entrapment avoidance: modelling evacuation triggers**

[www.nrfirescience.org/resource/12429](http://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](http://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

### **Perspectives on disconnects between scientific information and management decisions on post-fire recovery in western US**

[www.nrfirescience.org/resource/12035](http://www.nrfirescience.org/resource/12035)

Environmental regulations frequently mandate the use of 'best available' science, but ensuring that it is used in decisions around the use and protection of natural resources is often challenging. In the Western US, this relationship between science and management is at the forefront of post-fire land management decisions. Recent...

Author(s): Xiaoli Chen, Nathan Emery, Elizabeth S. Garcia, Erin J. Hanan, Heather E. Hodges, Tyronne Martin, Matthew A. Meyers, Lindsey E. Peavey, Hui Peng, Jaime Sainz Santamaria, Kellie A. Uyeda, Sarah E. Anderson, Christina Tague

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

### **Modeling wildfire incident complexity dynamics**

[www.nrfirescience.org/resource/16137](http://www.nrfirescience.org/resource/16137)

Wildfire management in the United States and elsewhere is challenged by substantial uncertainty regarding the location and timing of fire events, the socioeconomic and ecological consequences of these events, and the costs of suppression. Escalating U.S. Forest Service suppression expenditures is of particular concern at a time of...

Author(s): Matthew P. Thompson

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

### **Risk preferences in strategic wildfire decision making: a choice experiment with U.S. wildfire managers**

[www.nrfirescience.org/resource/12752](http://www.nrfirescience.org/resource/12752)

Federal policy has embraced risk management as an appropriate paradigm for wildfire management. Economic theory suggests that over repeated wildfire events, potential economic costs and risks of ecological damage are optimally balanced when management decisions are free from biases, risk aversion, and risk seeking. Of primary...

Author(s): Matthew J. Wibbenmeyer, Michael S. Hand, David E. Calkin, Tyron J. Venn, Matthew P. Thompson

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

## **Research and development supporting risk-based wildfire effects prediction for fuels and fire management: status and needs**

[www.nrfirescience.org/resource/12743](http://www.nrfirescience.org/resource/12743)

Wildland fire management has moved beyond a singular focus on suppression, calling for wildfire management for ecological benefit where no critical human assets are at risk. Processes causing direct effects and indirect, long-term ecosystem changes are complex and multidimensional. Robust risk-assessment tools are required that...

Author(s): Kevin D. Hyde, Matthew B. Dickinson, Gil Bohrer, David E. Calkin, Louisa Evers, Julie W. Gilbertson-Day, Tessa Nicolet, Kevin C. Ryan, Christina Tague

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

## **Using escaped prescribed fire reviews to improve or organizational learning - Final Report to the Joint Fire Science Program**

[www.nrfirescience.org/resource/18358](http://www.nrfirescience.org/resource/18358)

The US wildland fire community has been interested in cultivating organizational learning to improve safety and overall performance for a number of years. A key focus has been on understanding the difference between culpability (to be guilty) and accountability (to explain) and on re-orienting review processes towards building a...

Author(s): Anne E. Black, James M. Saveland, David Thomas, Jennifer Ziegler

Year Published: 2012

Type: Document

Technical Report or White Paper

## **Wildfire triage: targeting mitigation based on social, economic, and ecological values**

[www.nrfirescience.org/resource/16178](http://www.nrfirescience.org/resource/16178)

Evaluating the risks of wildfire relative to the valuable resources found in any managed landscape requires an interdisciplinary approach. Researchers at the Rocky Mountain Research Station and Western Wildland Threat Assessment Center developed such a process, using a combination of techniques rooted in fire modeling and ecology,...

Author(s): Karl Malcolm, Matthew P. Thompson, David E. Calkin, Mark A. Finney, Alan A. Ager

Year Published: 2012

Type: Document

Research Brief or Fact Sheet

## **Cramer Staff Ride: Preliminary study**

[www.nrfirescience.org/resource/18011](http://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

## **The Missoula Fire Sciences Laboratory: a 50-year dedication to understanding wildlands and fire**

[www.nrfirescience.org/resource/16347](http://www.nrfirescience.org/resource/16347)

In 1960, the USDA Forest Service established the Northern Forest Fire Laboratory (now the Missoula



Fire Sciences Laboratory) to find scientific solutions for better managing the nation's wildland resources and to research ways to improve forest fire prevention and suppression. This new state-of-the-art research facility did not...

Author(s): Diane M. Smith

Year Published: 2012

Type: Document

Technical Report or White Paper

### **The science and opportunity of wildfire risk assessment (Chapter 6)**

[www.nrfirescience.org/resource/16179](http://www.nrfirescience.org/resource/16179)

Wildfire management within the United States continues to increase in complexity, as the converging drivers of (1) increased development into fire-prone areas, (2) accumulated fuels from historic management practices, and (3) climate change potentially magnify threats to social and ecological values (Bruins et al., 2010; Gude et al...

Author(s): Matthew P. Thompson, Alan A. Ager, Mark A. Finney, David E. Calkin, Nicole M. Vaillant

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Wildland Fire Management Decision Making**

[www.nrfirescience.org/resource/21036](http://www.nrfirescience.org/resource/21036)

Wildland fire management in the United States has historically been a challenging and complex program governed by a multitude of factors including situational status, objectives, operational capability, science and technology, and changes and advances in all these factors. The improvement and advancement of risk-informed decision...

Author(s): Tom Zimmerman

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Recent advances in applying decision science to managing managing national forests**

[www.nrfirescience.org/resource/16176](http://www.nrfirescience.org/resource/16176)

Management of federal public forests to meet sustainability goals and multiple use regulations is an immense challenge. To succeed, we suggest use of formal decision science procedures and tools in the context of structured decision making (SDM). SDM entails four stages: problem structuring (framing the problem and defining...

Author(s): Bruce G. Marcot, Matthew P. Thompson, Michael C. Runge, Frank R. Thompson, Steven G. McNulty, David Cleaves, Monica S. Tomosy, Larry A. Fisher, Andrew Bliss

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Progress towards and barriers to implementation of a risk framework for US federal wildland fire policy and decision making**

[www.nrfirescience.org/resource/16180](http://www.nrfirescience.org/resource/16180)

In this paper we review progress towards the implementation of a risk management framework for US federal wildland fire policy and operations. We first describe new developments in wildfire simulation technology that catalyzed the development of risk-based decision support systems for strategic wildfire management. These systems...

Author(s): David E. Calkin, Mark A. Finney, Alan A. Ager, Matthew P. Thompson, Krista M. Gebert

Year Published: 2011

Type: Document  
Book or Chapter or Journal Article

### **Developing the U.S. Wildland Fire Decision Support System**

[www.nrfirescience.org/resource/21039](http://www.nrfirescience.org/resource/21039)

A new decision support tool, the Wildland Fire Decision Support System (WFDSS) has been developed to support risk-informed decision-making for individual fires in the United States. WFDSS accesses national weather data and forecasts, fire behavior prediction, economic assessment, smoke management assessment, and landscape databases...

Author(s): Erin Noonan-Wright, Tonja S. Opperman, Mark A. Finney, Tom Zimmerman, Robert C. Seli, Lisa M. Elenz, David E. Calkin, John R. Fiedler

Year Published: 2011

Type: Document  
Book or Chapter or Journal Article

### **A real-time risk assessment tool supporting wildland fire decisionmaking**

[www.nrfirescience.org/resource/12727](http://www.nrfirescience.org/resource/12727)

Development of appropriate management strategies for escaped wildland fires is complex. Fire managers need the ability to identify, in real time, the likelihood that wildfire will affect valuable developed and natural resources (e.g., private structures, public infrastructure, and natural and cultural resources). These...

Author(s): David E. Calkin, Matthew P. Thompson, Mark A. Finney, Kevin D. Hyde

Year Published: 2011

Type: Document  
Book or Chapter or Journal Article

### **The exposure index: developing firefighter safety performance measures**

[www.nrfirescience.org/resource/16182](http://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

### **The Wildland Fire Decision Support System: Integrating science, technology, and fire management**

[www.nrfirescience.org/resource/21042](http://www.nrfirescience.org/resource/21042)

Federal agency policy requires documentation and analysis of all wildland fire response decisions. In the past, planning and decision documentation for fires were completed using multiple unconnected processes, yielding many limitations. In response, interagency fire management executives chartered the development of the Wildland...

Author(s): Morgan Pence, Tom Zimmerman

Year Published: 2011

Type: Document  
Book or Chapter or Journal Article

### **Forest road erosion control using multiobjective optimization**

[www.nrfirescience.org/resource/16187](http://www.nrfirescience.org/resource/16187)

Forest roads are associated with accelerated erosion and can be a major source of sediment delivery to streams, which can degrade aquatic habitat. Controlling road-related erosion therefore remains an important issue for forest stewardship. Managers are faced with the task to develop efficient road management strategies to achieve...

Author(s): Matthew P. Thompson, Jeff Sessions, Kevin Boston, Arne Skaugset, David Tomberlin

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

### **Organizational learning contributes to guidance for managing wildland fires for multiple objectives**

[www.nrfirescience.org/resource/21043](http://www.nrfirescience.org/resource/21043)

Since the inception of organized fire suppression in the early 1900s, wildland fire management has dramatically evolved in operational complexity; ecological significance; social, economic, and political magnitude; areas and timing of application; and recognition of potentially serious consequences.

Throughout the past 100 years,...

Author(s): Tom Zimmerman, Tim Sexton

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

### **After-Action Reviews - who conducts them?**

[www.nrfirescience.org/resource/16401](http://www.nrfirescience.org/resource/16401)

Reflecting on the links between intentions and outcomes is a key practice of a learning organization (Garvin 2000). The After-Action Review (AAR) is a formal reflection process intended to assist groups in capturing lessons learned from a task. AARs typically ask four questions regarding fire-response operations: (1) what did we set...

Author(s): Anne E. Black, Kathleen Sutcliffe, Michelle Barton

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

### **The Key Decision Log: facilitating high reliability and organizational learning**

[www.nrfirescience.org/resource/16399](http://www.nrfirescience.org/resource/16399)

If you were involved in the 2008 fire season in the West, you may have heard the term "Key Decision Log" or "KDL." This article describes the KDL concept, it's intent (past and present), how it was applied in 2008, and where the practice is heading.

Author(s): Anne E. Black

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

### **Silenced by fear: The nature, sources, and consequences of fear at work**

[www.nrfirescience.org/resource/17078](http://www.nrfirescience.org/resource/17078)

In every organization, individual members have the potential to speak up about important issues, but a growing body of research suggests that they often remain silent instead, out of fear of negative personal and professional consequences. In this chapter, we draw on research from disciplines ranging from evolutionary psychology to...

Author(s): Jennifer J. Kish-Gephart, James R. Detert, Linda Klebe Trevino, Amy Edmondson

Year Published: 2009

Type: Document  
Book or Chapter or Journal Article

### **Challenges to educating the next generation of wildland fire professionals in the United States**

[www.nrfirescience.org/resource/12448](http://www.nrfirescience.org/resource/12448)

Over the last 20 years, the duties of US fire professionals have become more complex and risk laden because of fuel load accumulation, climate change, and the increasing wildland-urban interface. Incorporation of fire use and ecological principles into fire management policies has further expanded the range of expertise and...

Author(s): Leda N. Kobziar, Monique E. Rocca, Christopher A. Dicus, Chad M. Hoffman, Neil G. Sugihara, Andrea E. Thode, J. Morgan Varner, Penelope Morgan

Year Published: 2009

Type: Document  
Book or Chapter or Journal Article

### **Wildland Fire and Organic Discourse: Negotiating Place and Leisure Identity in a Changing Wildland Urban Interface**

[www.nrfirescience.org/resource/17484](http://www.nrfirescience.org/resource/17484)

A lack of research on the conceptual intersection of leisure, place and wildland fire and its role in identity prompted this exploratory study. The purpose of this research was to gather evidence regarding how people negotiate identities under the threat of wildland fire. Qualitative interviews with 16 homeowners and recreationists...

Author(s): Joseph Champ, Daniel R. Williams, Katie Knotek

Year Published: 2009

Type: Document  
Book or Chapter or Journal Article

### **Decision modeling for analyzing fire action outcomes**

[www.nrfirescience.org/resource/16234](http://www.nrfirescience.org/resource/16234)

A methodology for incident decomposition and reconstruction is developed based on the concept of an "event-frame model." The event-frame model characterizes a fire incident in terms of (a) environmental events that pertain to the fire and the fire context (e.g., fire behavior, weather, fuels) and (b) management events that represent...

Author(s): Donald G. MacGregor, Armando Gonzalez-Caban

Year Published: 2008

Type: Document  
Technical Report or White Paper

### **External Human Factors in Incident Management Team Decision making and Their Effect on Large Fire Suppression Expenditures**

[www.nrfirescience.org/resource/20522](http://www.nrfirescience.org/resource/20522)

Large wildland fires are complex, costly events influenced by a vast array of physical, climatic, and social factors. Changing climate, fuel buildup due to past suppression, and increasing populations in the wildland-urban interface have all been blamed for the extreme fire seasons and rising suppression expenditures of recent years...

Author(s): Janie Canton-Thompson, Krista M. Gebert, Brooke Thompson, J. Greg Jones, David E. Calkin, Geoffrey H. Donovan

Year Published: 2008

Type: Document  
Book or Chapter or Journal Article

### **Wildland fire use barriers and facilitators**

[www.nrfirescience.org/resource/16055](http://www.nrfirescience.org/resource/16055)

The Forest Service authorizes broad scale wildland fire use (WFU) both inside and outside wilderness areas in many western forests; but, will agency authorization alone lead to implementation? Understanding barriers and facilitators to WFU implementation is critical for establishing realistic program expectations and providing a...

Author(s): Anne E. Black, Martha A. Williamson, Dustin Doane

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

### **Management Strategies for Complex Adaptive Systems Sensemaking, Learning, and Improvisation**

[www.nrfirescience.org/resource/17434](http://www.nrfirescience.org/resource/17434)

Misspecification of the nature of organizations may be a major reason for difficulty in achieving performance improvement. Organizations are often viewed as machine-like, but complexity science suggests that organizations should be viewed as complex adaptive systems. I identify the characteristics of complex adaptive systems and...

Author(s): Reuben R. McDaniel

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

### **The fire environment -- Innovations, management, and policy**

[www.nrfirescience.org/resource/16904](http://www.nrfirescience.org/resource/16904)

The 2nd Fire Behavior and Fuels Conference: Fire Environment – Innovations, Management and Policy was held in Destin, FL, March 26-30, 2007. Following on the success of the 1st Fire Behavior and Fuels Conference, this conference was initiated in response to the needs of the National Wildfire Coordinating Group – Fire Environment...

Author(s): Bret W. Butler, Wayne A. Cook

Year Published: 2007

Type: Document

Conference Proceedings

### **Factors in United States Forest Service district rangers' decision to manage a fire for resource benefit**

[www.nrfirescience.org/resource/8204](http://www.nrfirescience.org/resource/8204)

United States wildland fire policy and program reviews in 1995 and 2000 required both the reduction of hazardous fuel and recognition of fire as a natural process. Despite the fact that existing policy permits managing natural ignitions to meet resource benefits, or Wildland Fire Use (WFU), most fuel reduction projects rely on...

Author(s): Martha A. Williamson

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

### **Managing the unexpected: resilient performance in an age of uncertainty**

[www.nrfirescience.org/resource/15972](http://www.nrfirescience.org/resource/15972)

Thousands of firefighters across the United States have been influenced by the first edition of "Managing the Unexpected". In this second edition, the authors continue their analysis of high reliability

organizations (HRO's), which are organizations that routinely operate in high risk environments (where the consequences of...

Author(s): Karl E. Weick, Kathleen Sutcliffe

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

### **The go point: when it's time to decide - knowing what to do and when to do it**

[www.nrfirescience.org/resource/16253](http://www.nrfirescience.org/resource/16253)

In Useem's earlier book, "The Leadership Moment," he described leadership lessons that could be learned from various situations, including the Mann Gulch disaster. In this book, Useem has turned his attention from leadership to decision making, where he states that every decision comes down to a "go point—that decisive...

Author(s): Michael Useem

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

### **A national study of the consequences of fire and fire surrogate treatments**

[www.nrfirescience.org/resource/15633](http://www.nrfirescience.org/resource/15633)

We provide highlights of some of the results thus far for the National Fire and Fire Surrogate study (FFS). Highlights summarize work that has been published within the last four years (2003-2006), primarily in theses, proceedings, general technical reports, and peer-reviewed journals (<http://www.fs.fed.us/ffs/>). In the summary, we...

Author(s): James D. Mclver, Phil Weatherspoon

Year Published: 2006

Type: Document

Technical Report or White Paper

### **Shared mindfulness in cockpit crisis situations**

[www.nrfirescience.org/resource/15912](http://www.nrfirescience.org/resource/15912)

Research reveals that human error contributes 60 to 80 percent of error in aviation accidents and disasters. Thus, despite innovations in technology and safety materials, individuals must be able to make speedy yet intelligent decisions and be able to communicate those decisions in an efficient manner. Krieger explores the...

Author(s): Janice L. Krieger

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

### **Can behavioral decision theory explain risk-averse fire management decisions?**

[www.nrfirescience.org/resource/12719](http://www.nrfirescience.org/resource/12719)

Organizations managing forest land often make fire management decisions that seem overly risk-averse in relation to their stated goals for ecosystem restoration, protection of sensitive species and habitats, and protection of water and timber resources. Research in behavioral decision theory has shown that people faced with...

Author(s): Lynn A. Maguire, Elizabeth A. Albright

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

### **Use of human factors analysis for wildland fire accident investigations**

[www.nrfirescience.org/resource/196](http://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](http://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

### **Line Officers' Views on Stated USDA Forest Service Values and the Agency Reward System**

[www.nrfirescience.org/resource/20525](http://www.nrfirescience.org/resource/20525)

To update and expand a study done in 1989 (Kennedy et al. 1992), we surveyed line officers attending the third National Forest Supervisors' Conference (Chief, Associate Chief, deputy chiefs, regional foresters, directors of International Institute of Tropical Forestry and State and Private Forestry Northeastern Area, and forest...

Author(s): James J. Kennedy, R. W. Haynes, Xiaoping Zhou

Year Published: 2005

Type: Document

Technical Report or White Paper

### **Integral leadership and signal detection for high reliability organizing and learning**

[www.nrfirescience.org/resource/15471](http://www.nrfirescience.org/resource/15471)

In the last ten years, the fire management community has made significant advances in firefighter safety and leadership development. Yet, there is no discernible downward trend in entrapment fatalities. While the complexity of the job and exposure of an increasing number of firefighters to increasingly severe situations has surely...

Author(s): James M. Saveland

Year Published: 2005

Type: Document

Conference Proceedings

### **Eighth international wildland firefighter safety summit: 10 years later**

[www.nrfirescience.org/resource/15458](http://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 smarts: how to cultivate and transfer enduring business wisdom**

[www.nrfirescience.org/resource/15835](http://www.nrfirescience.org/resource/15835)

This book describes a process of extracting knowledge from inside the heads of people who possess high expertise in their work, and then describes numerous ways this knowledge can be delivered to people with less expertise. People with high expertise are said to have “deep smarts” about their work, a form of work-related...

Author(s): Dorothy Leonard, Walter Swap  
Year Published: 2005  
Type: Document  
Book or Chapter or Journal Article

### **On becoming an artist: reinventing yourself through mindful creativity**

[www.nrfirescience.org/resource/15831](http://www.nrfirescience.org/resource/15831)

In this book, Langer augments her previous work on mindfulness and artistic nature with insights on creativity. Langer discusses how creativity is not a rare trait, but a part of every person’s makeup. While all people have the ability to express themselves creatively, many people undervalue themselves, which serves to undermine...

Author(s): Ellen J. Langer  
Year Published: 2005  
Type: Document  
Book or Chapter or Journal Article

### **Blink: the power of thinking without thinking**

[www.nrfirescience.org/resource/16211](http://www.nrfirescience.org/resource/16211)

Consistently successful decision making can make or break an individual or an organization. Perhaps counter intuitively, individuals who repeatedly make effective, successful decisions are not necessarily those who have the most information or spend the most time weighing the decision. Instead, they have perfected the art of “thin...

Author(s): Malcolm Gladwell  
Year Published: 2005  
Type: Document  
Book or Chapter or Journal Article

### **The skilled facilitator fieldbook: tips, tools and tested methods for consultants, facilitators, managers, trainers and coaches**

[www.nrfirescience.org/resource/15840](http://www.nrfirescience.org/resource/15840)

This fieldbook, a compendium of 62 articles by consultants, facilitators and organizational psychologists, is organized into seven parts that describe in detail the skilled facilitator approach to running meetings and facilitating groups. This approach seeks to understand the core values and assumptions working within groups and to...

Author(s): Roger Schwarz, Anne Davidson, Peg Carlson, Sue McKinney  
Year Published: 2005  
Type: Document  
Book or Chapter or Journal Article

### **Deep survival: who lives, who dies and why**



[www.nrfirescience.org/resource/16217](http://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

### **How professionals make decisions**

[www.nrfirescience.org/resource/16238](http://www.nrfirescience.org/resource/16238)

This book was published following a conference on naturalistic decision making held in Stockholm in 2000. Naturalistic decision making (NDM) is a subset of decision making theory that focuses on situations where there are ill-structured problems; uncertain dynamic environments; shifting, ill-defined, or competing goals; action/...

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

### **Public management decision making: effects of decision content**

[www.nrfirescience.org/resource/16203](http://www.nrfirescience.org/resource/16203)

One obvious aspect of public management decisions and decision making has largely escaped attention—decision content. We examine the effects of decision content by asking the following questions for budget cutback and information technology decisions: How does content affect the time required for decision making? How does content...

Author(s): Barry Bozeman, Sanjay K. Pandey

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

### **Managing the unexpected in prescribed fire and fire use operations: a workshop on the high reliability organization**

[www.nrfirescience.org/resource/15461](http://www.nrfirescience.org/resource/15461)

Fire management, and forest and rangeland fuels management, over the past century have altered the wildland fire situation dramatically, thus also altering the institutional approach to how to deal with the changing landscape. Also, climate change, extended drought, increased insect and disease outbreaks, and invasions of exotic...

Year Published: 2004

Type: Document

Technical Report or White Paper

### **MODIS Applications in 2003 Fire Management - Slide presentation**

[www.nrfirescience.org/resource/11516](http://www.nrfirescience.org/resource/11516)

Powerpoint presentation MODIS Applications in 2003 Fire Management

Author(s): C. A. Ryan, Bryce L. Nordgren, James P. Menakis, Mark A. Finney, Wei Min Hao

Year Published: 2004

Type: Document

Conference Proceedings

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

[www.nrfirescience.org/resource/16262](http://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

### **Columbia accident review board report**

[www.nrfirescience.org/resource/16259](http://www.nrfirescience.org/resource/16259)

The Columbia Accident Review Board's (CAIB) investigation of the February 1, 2003 loss of the space shuttle Columbia lasted nearly 7 months. The loss of seven crew members and later, two debris searchers, lead to a thorough attempt to discover the truth behind the accident. The board recognized early that the accident was not...

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Not all decisions are created equal: when faced with a series of tough choices, where do you start?**

[www.nrfirescience.org/resource/16228](http://www.nrfirescience.org/resource/16228)

Problem solvers need to examine the differences that exist between decisions and the approaches available for making decisions. This short article presents four types of decisions problem solvers face and offers recommendations for each. These types of decisions include: zone of indifference choices, comparison choices, intuitive...

Author(s): Gary Klein

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Wildland fire behavior case studies and analysis: part 2**

[www.nrfirescience.org/resource/15996](http://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

### **Training ecologists to think with uncertainty in mind**

[www.nrfirescience.org/resource/12642](http://www.nrfirescience.org/resource/12642)

Predictive capacity is needed to anticipate the consequences of global change. Along with the computational challenges inherent in accounting for uncertainty in models of ecological and physical processes related to global change, we face educational challenges related to developing the intellectual capital for thinking with...

Author(s): Carol A. Brewer, Louis J. Gross

Year Published: 2003

Type: Document

Book or Chapter or Journal Article, Synthesis

### **Situational influences of acceptable wildland fire management actions**

[www.nrfirescience.org/resource/21727](http://www.nrfirescience.org/resource/21727)

This paper examines how acceptance of wildland fire management actions is affected by fire-specific situational factors. Respondents' evaluated the acceptability of 'immediately extinguishing a fire,' 'letting the fire burn in a contained area,' or 'letting the fire burn uncontrolled' for eight scenarios (fractional factorial design...

Author(s): Katie Kneeshaw, Jerry J. Vaske, James D. Absher

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Sensemaking on the shop floor: narratives of knowledge in organizations**

[www.nrfirescience.org/resource/16264](http://www.nrfirescience.org/resource/16264)

In this study, Patriotta examines the ways in which an organization's workers experience the "everyday routines, interaction, and events that constitute both individual and social practices". He studies the narratives that are told within an organization, particularly during moments of disruptive occurrences. Examining these...

Author(s): Gerardo Patriotta

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Intuition at work**

[www.nrfirescience.org/resource/16229](http://www.nrfirescience.org/resource/16229)

Intuition is an important factor in decision making, equal to the roles of reading data and interpreting numbers. Klein defines intuition as "the way we translate our experiences into action". Based upon his research, involving interviews with a number of life-and-death decision makers, Klein found that 90 percent of critical...

Author(s): Gary Klein

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Why decisions fail**

[www.nrfirescience.org/resource/16242](http://www.nrfirescience.org/resource/16242)

In this book, Nutt discusses why half of all decisions that are made fail, how a decision becomes a fiasco, and how failures can be prevented. Failed decisions occur as a result of three blunders (rushing to judgment, misusing resources, and applying failure-prone tactics) and seven traps (misleading claims, barriers to action, lack...

Author(s): Paul C. Nutt

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

### **Emerging perspectives on judgment and decision research**

[www.nrfirescience.org/resource/16251](http://www.nrfirescience.org/resource/16251)

This edited book is an excellent resource for those who wish to probe deeper into the state of the art research on emerging issues in judgment and decision making. The editors' stated purpose is to provide "fresh perspectives on decision making". The authors are particularly interested in how non-

traditional topics such as...

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

### **Making strategic choices**

[www.nrfirescience.org/resource/16241](http://www.nrfirescience.org/resource/16241)

This article offers four alternative prescriptions for making strategic choices in organizations: 1) analysis; 2) inspiration; 3) bargaining; and 4) judgment. Decision makers should use analysis when both the objectives and the means for producing results are knowable. This means commissioning a pilot test to evaluate means and...

Author(s): Paul C. Nutt

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

### **Making sense of the organization**

[www.nrfirescience.org/resource/16265](http://www.nrfirescience.org/resource/16265)

This collection of Weick's writings addresses a central theme of organizational sensemaking, which he defines as a means by which organizational members retrospectively make sense of situations, actions, and choices. The first part of the book describes what sensemaking is and how it fits within the context of organizations,...

Author(s): Karl E. Weick

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/16257](http://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

### **Learning in action: a guide to putting the learning organization to work**

[www.nrfirescience.org/resource/15819](http://www.nrfirescience.org/resource/15819)

Creating a learning organization is a much needed, yet difficult to implement asset for any organization. While most managers agree on the importance of building this skill, few understand how to get started, what tools and techniques are needed, or even how to tell when they have truly created a learning organization. This book...

Author(s): David Garvin

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **A theory of everything: an integral vision for business, politics, science and spirituality**

[www.nrfirescience.org/resource/15845](http://www.nrfirescience.org/resource/15845)

Wilber provides a brief overview of a "Theory of Everything," which attempts to include matter, body, mind, soul, and spirit as they appear in self, culture, and nature. This theory provides an integral vision, which is a more holistic approach to the world in which we live. In order to explain the theory, Wilber devotes the...

Author(s): Ken Wilber

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **The Bitterroot Ecosystem Management Research Project: what we have learned, symposium proceedings; May 18-20, 1999; Missoula, MT**

[www.nrfirescience.org/resource/11890](http://www.nrfirescience.org/resource/11890)

The varied topics presented in these symposium proceedings represent the diverse nature of the Bitterroot Ecosystem Management Research Project (BEMRP). Separated into six sections, the papers cover the different themes researched by BEMRP collaborators as well as brief overviews of five other ecosystem management projects. The...

Author(s): Helen Y. Smith

Year Published: 2000

Type: Document

Conference Proceedings

### **Decisions: making the right ones. Learning from the wrong ones.**

[www.nrfirescience.org/resource/16230](http://www.nrfirescience.org/resource/16230)

This article critiques two predominant forms of decision making: rational-choice and the intuitive approach. The authors suggest a more productive approach to decision making is the experiential, or "recognize/react," approach. The experiential approach asserts that experience provides decision makers the ability to size up...

Author(s): Gary Klein, Karl E. Weick

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Working with emotional intelligence**

[www.nrfirescience.org/resource/15821](http://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

### **Lessons from Longford: the Esso Gas Plant explosion**

[www.nrfirescience.org/resource/15906](http://www.nrfirescience.org/resource/15906)

The Esso gas plant explosion of 1998 represents a series of organizational failures that resulted in devastating consequences, including two deaths. This book examines those organizational failures through the findings of the Royal Commission. The author argues that the accident was preventable and was caused by a number of failures...

Author(s): Andrew Hopkins

Year Published: 2000  
Type: Document  
Book or Chapter or Journal Article

### **Do conflict management styles affect group decision making? Evidence from a longitudinal field study**

[www.nrfirescience.org/resource/16233](http://www.nrfirescience.org/resource/16233)

This article examines the relationship between group management styles and the effectiveness of group decision making. The researchers first identified conflict management styles and then analyzed group decisions and their effectiveness. The results of the study show that most groups develop management styles consistent with one...

Author(s): Timothy Kuhn, M. Scott Poole

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Sources of power: how people make decisions**

[www.nrfirescience.org/resource/16227](http://www.nrfirescience.org/resource/16227)

Klein presents observations of humans acting under real-life constraints such as time pressure, high stakes outcomes, high-levels of personal responsibility, limited information, changing goals, and shifting conditions. Klein studies decision making in the field—observing firefighters, intensive-care units, and chess games—to...

Author(s): Gary Klein

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Dialogue and the art of thinking together**

[www.nrfirescience.org/resource/16219](http://www.nrfirescience.org/resource/16219)

In this book, Isaacs argues that we should learn to kindle and sustain a new conversational spirit in our relationships, organizations, and communities. A conversational spirit will help us in times of frustration and conflict and help us work together to a more promising future. Isaacs discusses what encourages and discourages such...

Author(s): William Isaacs

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

### **Managing major hazards: the lessons of the Moura Mine disaster**

[www.nrfirescience.org/resource/15905](http://www.nrfirescience.org/resource/15905)

In every organization, things go wrong. For the most part, these errors are minor and often go unnoticed. However, when disaster occurs, external pressure often forces the exposure of many of the failures that occur within an organization. Thus, a disaster can offer an opportunity for in-depth analysis of the internal workings of an...

Author(s): Andrew Hopkins

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

### **Surprising but true: half the decisions in organizations fail**

[www.nrfirescience.org/resource/16240](http://www.nrfirescience.org/resource/16240)

According to Nutt, decisions that fail in organizations can be traced to managers who impose decisions, limit the search for alternatives, and use power to implement plans. Nutt finds that managers who make the need for action clear, set objectives, search for multiple alternatives, and encourage participation from others are more...

Author(s): Paul C. Nutt

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

### **Normal accidents: living with high-risk technologies**

[www.nrfirescience.org/resource/15886](http://www.nrfirescience.org/resource/15886)

Many of the accidents that organizations face are a result of complex interactions between multiple events and with multiple actors. They cannot be explained as being only one group or individual's "fault". In this book, Perrow investigates the complexity of accidents as events that are inevitable because of the complex...

Author(s): Charles Perrow

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

### **Heroic modes: the hidden dynamics of high-stakes situations**

[www.nrfirescience.org/resource/15829](http://www.nrfirescience.org/resource/15829)

In this chapter, Kantor and Ober introduce a model for dealing with conflicts that arise when employees are resistant to organizational change. Change situations are high stakes situations that cause greater fear and anxiety than low stakes situations such as everyday conflict. The authors argue that, during high stakes situations,...

Author(s): David Kantor, Steven Ober

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/15478](http://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

### **Organizational learning activities in high-hazard industries: the logics underlying self-analysis**

[www.nrfirescience.org/resource/15818](http://www.nrfirescience.org/resource/15818)

Carroll begins by discussing how different staff members in an organization know different things about how work is accomplished. For an organization to run properly, these staff members must engage in organizational learning, which means facilitating the development of organizational knowledge by supporting each other and...

Author(s): John S. Carroll

Year Published: 1998

Type: Document

Book or Chapter or Journal Article

### **Improvisation as a mindset for organizational analysis**

[www.nrfirescience.org/resource/15843](http://www.nrfirescience.org/resource/15843)

Weick uses the metaphor of jazz improvisation to discuss the way people verbally communicate about organizational improvisation. He argues that the descriptions and processes used to discuss composing on the spur of the moment provide a lexicon for discussing concepts central to organizational theory.

Weick places an emphasis on the...

Author(s): Karl E. Weick

Year Published: 1998

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/15893](http://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](http://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](http://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

### **The Challenger launch decision: risky technology, culture, and deviance at NASA**

[www.nrfirescience.org/resource/16255](http://www.nrfirescience.org/resource/16255)

In the wake of the explosion of the 1986 space shuttle Challenger, a conventional explanation for the



tragedy emerged: the economic strain on NASA caused managers to withhold information about safety violations in order to maintain the launch schedule. In her book, Diane Vaughan contradicts this conventional explanation by providing...

Author(s): Diane Vaughan

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](http://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

### **Reframing and organizational action**

[www.nrfirescience.org/resource/16245](http://www.nrfirescience.org/resource/16245)

Palmer and Dunford analyze the concept of reframing and discuss four key limits to this concept.

Reframing literature asserts that people generally are trapped into a singular way of thinking about a situation, and thus, they are unable to think more creatively about situations and problems they may encounter on the job. Some...

Author(s): Ian Palmer, Richard Dunford

Year Published: 1996

Type: Document

Book or Chapter or Journal Article

### **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](http://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

### **Learning from mistakes is easier said than done: group and organizational influences on the detection and correction of human error**

[www.nrfirescience.org/resource/15878](http://www.nrfirescience.org/resource/15878)

Researchers have often studied and discussed errors and accidents within an organizational setting in two ways. The first focuses on the individual, while the second looks at the system in which the individual operates. Edmondson argues for a third perspective, one that looks at both the individual and the system, and specifically...

Author(s): Amy Edmondson

Year Published: 1996

Type: Document

Book or Chapter or Journal Article

### **Drop your tools: an allegory for organizational studies**

[www.nrfirescience.org/resource/16256](http://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

### **Toward a theory of situation awareness in dynamic systems**

[www.nrfirescience.org/resource/16209](http://www.nrfirescience.org/resource/16209)

Endsley examines the interrelation between situation awareness and individual and environmental factors. Endsley argues that situation awareness is more than a person just being aware of the situation. Rather, it is a complex understanding of the situation, and requires the ability to project what the future might bring. Further,...

Author(s): Mica Endsley

Year Published: 1995

Type: Document

Book or Chapter or Journal Article

### **Beyond aviation human factors: safety in high technology systems**

[www.nrfirescience.org/resource/15883](http://www.nrfirescience.org/resource/15883)

Aviation human factors investigations have typically blamed individual behavior as the primary cause of serious work accidents. However, this book argues that organizations are responsible for two aspects that contribute to work related accidents: 1) the local working conditions that restrict how workers can behave and 2) the...

Author(s): Daniel E. Maurino, James Reason, Neil Johnston, Rob B. Lee

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](http://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](http://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](http://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](http://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

### **Sensemaking in organizations**

[www.nrfirescience.org/resource/16258](http://www.nrfirescience.org/resource/16258)

Sensemaking is about how people make sense of situations. When faced with problems, people construct meaning. This constructive process plays a key role in the ultimate understanding that is developed. The meaning of a situation is both created and interpreted through sensemaking. Weick lists seven distinguishing characteristics of...

Author(s): Karl E. Weick

Year Published: 1995

Type: Document

Book or Chapter or Journal Article

### **Causes of disaster: sloppy management**

[www.nrfirescience.org/resource/15891](http://www.nrfirescience.org/resource/15891)

Turner argues that while the best way to avoid disasters is primarily "for managers to establish, to strengthen, and then to assert control," management control only addresses part of the problem, and there are limitations that affect management in disaster situations. Turner advocates examining three interrelated factors in a...

Author(s): Barry Turner

Year Published: 1994

Type: Document

Book or Chapter or Journal Article

### **The fifth discipline fieldbook: strategies and tools for building a learning organization**

[www.nrfirescience.org/resource/15842](http://www.nrfirescience.org/resource/15842)

This fieldbook, though dated, remains an excellent resource for anyone interested in using the principles of learning organizations in a field setting. It is a companion to Senge's book, "The Fifth Discipline: The Art and Practice of the Learning Organization". The fieldbook is a series of notes, reflections, and exercises...

Author(s): Peter Senge, Art Kleiner, Charlotte Roberts, Richard Ross, Bryan Smith

Year Published: 1994

Type: Document

Book or Chapter or Journal Article

### **Communities of commitment: the heart of learning organizations**

[www.nrfirescience.org/resource/15813](http://www.nrfirescience.org/resource/15813)

In this article, Kofman and Senge explore shifts in contemporary management principles. They argue that the common organizational complaints of reactivity, competition, and fragmentation are larger societal issues. These problems cannot simply be solved, but need to be dissolved through a new way of thinking, feeling, and being....

Author(s): Fred Kofman, Peter Senge

Year Published: 1993

Type: Document

Book or Chapter or Journal Article

### **Organizational values and control**

[www.nrfirescience.org/resource/16205](http://www.nrfirescience.org/resource/16205)

Using the USDA Forest Service as an example, Bullis shows how decision making is largely determined by decision premises. Examples of premises include values, beliefs, and more broadly, culture. Bullis explores the ability of organizations to control decision making through employee identification with shared value premises. The...

Author(s): Connie Bullis

Year Published: 1993

Type: Document

Book or Chapter or Journal Article

### **The collapse of sensemaking in organizations: the Mann Gulch disaster**

[www.nrfirescience.org/resource/15592](http://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

### **Putting the balanced scorecard to work**

[www.nrfirescience.org/resource/16225](http://www.nrfirescience.org/resource/16225)

This article summarizes Kaplan and Norton's earlier work on the "balanced scorecard" system, a set of measures designed to give a manager an overview of business performance. This comprehensive

scorecard system is grounded in an organization's strategic objectives and competitive demands. It includes measures of financial...

Author(s): Robert S. Kaplan, David P. Norton

Year Published: 1993

Type: Document

Book or Chapter or Journal Article

### **The textual approach: risk and blame in disaster sensemaking**

[www.nrfirescience.org/resource/16261](http://www.nrfirescience.org/resource/16261)

This article investigates responses to a gas pipeline explosion as a means of uncovering the methods that organizations and other participants use to make sense during disaster and to change situations. Sensemaking deals with how organizations and individuals explain or "make sense of" what goes on around them. Gephart is...

Author(s): Robert P. Gephart Jr.

Year Published: 1993

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/11196](http://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. Roethermel

Year Published: 1993

Type: Document

Technical Report or White Paper

### **The balanced scorecard: measures that drive performance**

[www.nrfirescience.org/resource/16224](http://www.nrfirescience.org/resource/16224)

This article introduces the reader to Kaplan and Norton's "balanced scorecard" system, a set of measures designed to give a manager an overview of business performance. The scorecard includes four measures. The first measure is financial, the traditional measure of performance. The other three measures include customer...

Author(s): Robert S. Kaplan, David P. Norton

Year Published: 1992

Type: Document

Book or Chapter or Journal Article

### **Pinto fires and personal ethics: a script analysis of missed opportunities**

[www.nrfirescience.org/resource/16215](http://www.nrfirescience.org/resource/16215)

This article gives a personal account of Gioia's experience with the Ford Motor Company during a defective vehicle recall. As the recall coordinator, Gioia had to manage a busy office and keep up with a large amount of information that he needed to process. In comparing himself to a fireman, he states that his job felt like...

Author(s): Dennis Gioia

Year Published: 1992

Type: Document

Book or Chapter or Journal Article

### **The fifth discipline**

[www.nrfirescience.org/resource/15814](http://www.nrfirescience.org/resource/15814)

This book takes a systems approach to organizational learning. Senge argues that “a learning organization is a place where people are continually discovering how they create reality. And how they can change it”. This book explains why a learning organization is important and describes how to create one. The book is divided into...

Author(s): Peter Senge

Year Published: 1990

Type: Document

Book or Chapter or Journal Article

### **Overcoming organizational defenses: facilitating organizational learning**

[www.nrfirescience.org/resource/15810](http://www.nrfirescience.org/resource/15810)

Organizations often suffer because workers and managers avoid embarrassment by turning a blind eye toward mistakes. This book focuses on errors that are consciously buried in order to avoid situations that might damage individual reputations. Using examples from businesses across the United States and government errors like the...

Author(s): Chris Argyris

Year Published: 1990

Type: Document

Book or Chapter or Journal Article

### **Decision traps**

[www.nrfirescience.org/resource/16248](http://www.nrfirescience.org/resource/16248)

As with any other skill, the ability to make effective decisions can be taught and improved upon. Russo and Shoemaker provide a guide to systematic decision making by delineating several key points in the decision making process. The first step in the process is to determine how to frame issues effectively. Once the problem/ issue...

Author(s): J. Edward Russo, Paul J. H. Shoemaker

Year Published: 1989

Type: Document

Book or Chapter or Journal Article

### **Benchmarking: the search for industry best practices that lead to superior performance**

[www.nrfirescience.org/resource/15816](http://www.nrfirescience.org/resource/15816)

Organizations need reliable ways to adjust business practices when work conditions change. A proven method of successfully learning and applying organizational best practices is through a process called benchmarking. This book introduces the benchmarking process by showing how to: 1) structure and conduct investigations, 2) analyze...

Author(s): Robert C. Camp

Year Published: 1989

Type: Document

Book or Chapter or Journal Article

### **Decision traps: the ten barriers to brilliant decision-making and how to overcome them**

[www.nrfirescience.org/resource/18893](http://www.nrfirescience.org/resource/18893)

Make Every Decision Your Best Decision Executives rate decision-making ability as the most important business skill, but few people have the training they need to make good decisions consistently. Becoming a good decision-maker is like training to be a top athlete: Just as the best coaches use training methods to help athletes...

Author(s): J. Edward Russo, Paul J. H. Schoemaker  
Year Published: 1989  
Type: Document  
Book or Chapter or Journal Article

### **Making fast strategic decisions in high-velocity environments**

[www.nrfirescience.org/resource/16207](http://www.nrfirescience.org/resource/16207)

In order to make reliable decisions, organizations need to have reliable access to critical information. However, high velocity environments place severe restrictions on information flow. Despite this handicap, many organizations in high velocity environments are still able to achieve relatively high levels of success. This study...

Author(s): Kathleen Eisenhardt  
Year Published: 1989  
Type: Document  
Book or Chapter or Journal Article

### **Enacted sensemaking in crisis situations**

[www.nrfirescience.org/resource/16266](http://www.nrfirescience.org/resource/16266)

Crisis situations are often complicated by the very behaviors people use to manage crisis. Enactment suggests that how people think about the work they do shapes how they behave toward that work. This process allows people to see certain aspects of a situation while being blind to others. Enactment influences the course of a crisis...

Author(s): Karl E. Weick  
Year Published: 1988  
Type: Document  
Book or Chapter or Journal Article

### **Locating suppression resources by travel times to wildfires**

[www.nrfirescience.org/resource/11472](http://www.nrfirescience.org/resource/11472)

Two mathematical models are given to determine the best locations for initial attack resources in terms of travel time: a linear programming model and a statistical model. An example for the Clearwater National Forest in Idaho illustrates some of the differences between the two models.

Author(s): Romain Mees  
Year Published: 1986  
Type: Document  
Research Brief or Fact Sheet

### **Threat rigidity effects in organizational behavior: a multilevel analysis**

[www.nrfirescience.org/resource/15967](http://www.nrfirescience.org/resource/15967)

This article addresses how organizations deal with adversity and how organizations adapt within adverse conditions. The authors comment that most research emphasizes "organizational and not individual or group responses to adversity," and those studies tend to "take a functional stance". What those approaches leave out is...

Author(s): Barry Staw, Lance Sandelands, Jane Dutton  
Year Published: 1981  
Type: Document  
Book or Chapter or Journal Article

### **Organizational factors in fire prevention: roles, obstacles, and recommendations**

[www.nrfirescience.org/resource/11471](http://www.nrfirescience.org/resource/11471)

Problems being encountered in implementing fire prevention programs were explored by studying the organization for fire prevention at the Fish Lake, Uinta, and Wasatch National Forests in Utah. The study focused on role congruency in fire prevention activities and on the social and organizational obstacles to effective programs. The...

Author(s): John R. Christiansen

Year Published: 1976

Type: Document

Technical Report or White Paper

### **Victims of groupthink: a psychological study of foreign-policy decisions and fiascoes**

[www.nrfirescience.org/resource/16221](http://www.nrfirescience.org/resource/16221)

According to Janis, groupthink occurs when "members of any small cohesive group tend to maintain esprit de corps by unconsciously developing a number of shared illusions and related norms that interfere with critical thinking and reality testing". Groupthink can lead to group members making faulty decisions together because they...

Author(s): Irving L. Janis

Year Published: 1972

Type: Document

Book or Chapter or Journal Article

### **The relationship of jet streams to forest fires**

[www.nrfirescience.org/resource/11470](http://www.nrfirescience.org/resource/11470)

Problems being encountered in implementing fire prevention programs were explored by studying the organization for fire prevention at the Fish Lake, Uinta, and Wasatch National Forests in Utah. The study focused on role congruency in fire prevention activities and on the social and organizational obstacles to effective programs. The...

Author(s): V. J. Schaefer

Year Published: 1957

Type: Document

Book or Chapter or Journal Article