A Qualitative Study on the US Forest Service’s Risk Management Assistance Efforts to Improve Wildfire Decision-Making

www.nrfirescience.org/resource/22885

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

Monetising the savings of remotely sensed data and information in Burn Area Emergency Response (BAER) wildfire assessment

www.nrfirescience.org/resource/22536

We used a value of information approach to demonstrate the cost-effectiveness of using satellite imagery as part of the Burn Area Emergency Response (BAER), a US federal program that identifies imminent post-wildfire threats to human life and safety, property and critical natural or cultural resources. We compared the costs...

Author(s): Richard Bernknopf, Yusuke Kuwayama, Reily Gibson, Jessica Blakely, Bethany Mabee, T. J. Clifford, Brad Quayle, Justin Epting, Terry Hardy, David C. Goodrich
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

Perceptions of NRCS Assistance with Prescribed Fires on U.S. Private Lands: A Regionally Stratified Case Study

www.nrfirescience.org/resource/23499

The benefits of prescribed fires are recognized throughout the United States, but the ability to assist with prescribed fire application on private land by government agencies has many possible constraints and challenges. The Natural Resources Conservation Service (NRCS), a federal agency, is mandated to assist private landowners...

Author(s): Ryan Wilbur, Charles Stanley, Kristie A. Maczko, John Derek Scasta
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

Transcending Parallel Play: Boundary Spanning for Collective Action in Wildfire Management

www.nrfirescience.org/resource/23386

A key challenge in the United States is how to manage wildfire risk across boundaries and scales, as roles, responsibilities, and ability to act are distributed among actors in ways that do not always incentivize collective action. In this review paper, we provide several conceptual contributions to the understanding of wildfire...

Author(s): Emily Jane Davis, Heidi Huber-Stearns, Anthony S. Cheng, Meredith Jacobson
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

Pyrodiversity and biodiversity: A history, synthesis, and outlook

www.nrfirescience.org/resource/23363

Aim: Pyrodiversity is the spatial or temporal variability in fire effects across a landscape. Multiple
ecological hypotheses, when applied to the context of post-fire systems, suggest that high pyrodiversity will lead to high biodiversity. This resultant “pyrodiversity–biodiversity” hypothesis has grown popular but has...

Author(s): Gavin M. Jones, Morgan W. Tingley
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

**Fuel management operations planning in fire management: a bilevel optimisation approach**

Elevated fuel loads represent a wildfire hazard in a landscape. Reducing fuel load is one mitigation strategy commonly employed to decrease the severity and impact of wildfires. The planning of such fuel management operations, however, represents a complicated decision problem, which includes multiple sources of uncertainty. In this...

Author(s): Federico Liberatore, Javier Leon, John W. Hearne, Begoña Vitoriano
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

**Resilient landscapes to prevent catastrophic forest fires**

Extreme wildfires are a major environmental and socioeconomic threat across many regions worldwide. The limits of fire suppression-centred strategies have become evident even in technologically well-equipped countries, due to high-cost and a legacy of landscape transformations, yet with ultimately low-efficient solutions vis-à-vis...

Author(s): Sven Wunder, David E. Calkin, Val Charlton, Sarah Feder, Inazio Martinez de Arano, Peter F. Moore, Francisco Rodriguez y Silva, Luca Tacconi, Cristina Vega-García
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

**Does conserving roadless wildland increase wildfire activity in western US national forests?**

National forests in the western United States are divided roughly in half between lands without roads managed for wilderness characteristics and lands with an extensive road system managed for multiple uses including resource extraction. We investigated the influence of these land use designations on fire ignitions, fire extent, and...

Author(s): James D. Johnston, John B. Kilbride, Garrett W. Meigs, Christopher J. Dunn, Robert E. Kennedy
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

**Development and application of the fireshed registry**

The Fireshed Registry is an interactive geospatial data portal providing access to data describing past, present, and future trends regarding wildfire exposure to communities and forest and fuel management. The registry employs a nested spatial framework that organizes landscape variation in wildfire risk to developed areas into...

Author(s): Alan A. Ager, Michelle A. Day, Chris Ringo, Cody Evers, Fermin Alcasena-Urdiroz, Rachel M. Houtman, Michael Scanlon, Tania Ellersick
What makes a resilient landscape? Climate, fire, and forests in the Northern Rockies
www.nrfirescience.org/resource/23344
Determining whether forest landscapes can maintain their resilience to fire – that is, their ability to rebound and sustain – given rapid climate change and increasing fire activity is a pressing challenge throughout the American West. Many western forests are well adapted to fire, and even subalpine forests that experience...
Author(s): Monica G. Turner
Year Published: 2021
Type: Document
Research Brief or Fact Sheet

Effects of collaborative monitoring and adaptive management on restoration outcomes in dry conifer forests
www.nrfirescience.org/resource/23187
In response to large, severe wildfires across the western US, federal initiatives have been enacted to increase the pace, scale, and quality of ecological restoration in fire dependent forests. To address uncertainty and controversy in agreement among specific restoration prescriptions on national forest land, several initiatives...
Author(s): Kevin J. Barrett, Jeffery B. Cannon, Alex M. Schuetter, Anthony S. Cheng
Year Published: 2021
Type: Document
Book or Chapter or Journal Article

Processed-based fire models: New tools for an era of novel conditions
www.nrfirescience.org/resource/21520
The first few years of the 21st century brought a series of unprecedented natural disturbances to the southwestern U.S. A severe drought, later tagged as a “global change type drought,” triggered the mortality of 1,000 of native trees. For some species, such as the ponderosa pine, the drought was especially lethal due to high...
Author(s): Carolyn Hull Sieg, Rodman Linn, F. Pimont, Chad M. Hoffman, Joel D. McMillin, Judith Winterkamp, L. Scott Baggett
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Assessing the shape accuracy of coarse resolution burned area identifications
www.nrfirescience.org/resource/20953
Accuracy assessment of burned area maps has been traditionally performed using pixel-based metrics, with the objective of assessing the accuracy and precision of burned area estimates at local and regional scales. While these assessments are helpful for obtaining consistent estimates of the burned area across many fires and over...
Author(s): Michael L. Humber, Luigi Boschetti, Louis Giglio
Year Published: 2020
Type: Document
Book or Chapter or Journal Article
Integrating functional connectivity and fire management for better conservation outcomes
www.nrfirescience.org/resource/21516
Globally, the mean abundance of terrestrial animals has fallen by 50% since 1970, and populations face ongoing threats associated with habitat loss, fragmentation, climate change and disturbance. Climate change can influence the quality of remaining habitat directly, and indirectly by precipitating increases in the extent, frequency...
Author(s): Holly Sitters, Julian Di Stefano
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

What controls fire spatial patterns? Predictability of fire characteristics in the Canadian boreal plains ecozone
www.nrfirescience.org/resource/20667
Most regulatory and certification agencies in Canada now require forest management plans to include some level of historical fire pattern approximation. As a result, sustainable forest management and enhancements to existing fire management policies and practices require a thorough understanding of the spatial fire patterns created...
Author(s): Ignacio San-Miguel, Nicholas C. Coops, Raphael D. Chavardes, David W. Andison, Paul D. Pickell
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Unitemporal approach to fire severity mapping using multispectral synthetic databases and Random Forests
www.nrfirescience.org/resource/22304
Fire severity assessment is crucial for predicting ecosystem response and prioritizing post-fire forest management strategies. Although a variety of remote sensing approaches have been developed, more research is still needed to improve the accuracy and effectiveness of fire severity mapping. This study proposes a unitemporal...
Author(s): Raquel Montorio Llovería, Fernando Pérez-Cabello, Daniel Borini Alves, Alberto García-Martín
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

RUIM - A fire safety engineering model for rural urban interface firefighter taskforce deployment
www.nrfirescience.org/resource/21289
Firefighting at the rural urban interface remains one of the most dangerous activities undertaken by fire services internationally. Whilst there is a significant volume of literature and describing methods for fire engineering safety analysis in the urban environment, a significant gap remains in the context of the rural urban...
Author(s): Greg Penney, Daryoush Habibi, Marcus Cattani
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Fire history (1889-2017) in the South Fork Flathead River Watershed within the Bob Marshall Wilderness (Montana), including effects of single and repeat wildfires on forest structure and fuels
Wilderness areas offer value to society as a source of scientific information. We used fire perimeter records from the upper South Fork Flathead River watershed (Montana) to characterize the area burned one or more times during three periods: the pre-fire exclusion period (1889-1934), the fire exclusion period (1935-1980), and the...

Author(s): Andrew J. Larson, Julia Berkey, Colin T. Maher, Wyatt Trull, R. Travis Belote, Carol Miller
Year Published: 2020
Type: Document
Conference Proceedings

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

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...

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

**The proximal drivers of large fires: a pyrogeographic study**

Variations in global patterns of burning and fire regimes are relatively well measured, however, the degree of influence of the complex suite of biophysical and human drivers of fire remains controversial and incompletely understood. Such an understanding is required in order to support current fire management and to predict the...

Author(s): Hamish G. Clarke, Trent D. Penman, Matthias M. Boer, Geoffrey J. Cary, Joseph B. Fontaine, Owen F. Price, Ross A. Bradstock
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

**The Use of Science in Wildland Fire Management: a Review of Barriers and Facilitators**

Purpose of Review: Science plays a critical role in natural resource management, and the use of science in decision-making is mandated by several policy initiatives. Other disciplines have documented the challenges associated with applying science to management and possible solutions to overcoming challenges, but the evaluation of...

Author(s): Molly E. Hunter, Melanie M. Colavito, Vita Wright
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

**Adaptive prescribed burning in Australia for the early 21st Century – context, status, challenges**

Despite evident advances in knowledge and understanding concerning the application of prescribed burning for delivering benefits in wildfire control and a variety of sociocultural, economic and
environmental outcomes, the practical application of prescribed burning in Australia is increasingly administratively and logistically...

Author(s): Jeremy Russell-Smith, Lachlan McCaw, Adam J. Leavesley
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

A survey on systematic approaches in managing forest fires
www.nrfirescience.org/resource/21637
Natural disastrous events are part and parcel of our times and do occur when we least expect it to strike us. Disasters which take place in the vicinity of human livelihood due to natural causes, such as forest fires, tsunami, earthquakes, floods, storms etc., the consequence or toll on lives and structures is colossal. Such mishaps...
Author(s): Aditya Dhall, Akash Dhasade, Mohan Raj V.K., Vinay Kulkarni
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Exploring adoption of the wildland fire decision support system: end user perspectives
www.nrfirescience.org/resource/20974
The increasing complexity of wildland fire management highlights the importance of sound decision making. Numerous fire management decision support systems (FMDSS) are designed to enhance science and technology delivery or assist fire managers with decision-making tasks. However, few scientific efforts have explored the adoption and...
Author(s): Peter Noble, Travis B. Paveglio
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Elucidating and disseminating the role of fire mosses in post-fire ecosystem recovery - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/22544
The extent of severely burned landscapes are increasing in the Western US due to climate change and altered forest states. Directly after a wildfire, managers implement techniques to stabilize soils or harvest merchantable timber. Collaborating with land managers from the Colville National Forest in Northeastern Washington we built...
Author(s): Henry S. Grover, Matthew A. Bowker
Year Published: 2020
Type: Document
Technical Report or White Paper

Clarifying the degree and type of public good collective action problem posed by natural resource management challenges
www.nrfirescience.org/resource/21519
Increasingly, scholars have sought to understand the role of collective action across property boundaries to address natural resource management challenges. Although the growing focus on collective action for natural resource management has led to many new and potentially useful insights for governance and outreach, we suggest that...
Author(s): Rebecca M. Niemiec, Sarah M. McCaffrey, Megan S. Jones
Year Published: 2020
Type: Document
Resistance and Representation in a Wildland–Urban Interface Fuels Treatment Conflict: The Case of the Forsythe II Project in the Arapaho-Roosevelt National Forest

Land treatments in wildland-urban interface (WUI) areas are highly visible and subject to public scrutiny and possible opposition. This study examines a contested vegetation treatment-Forsythe II-in a WUI area of the Arapaho-Roosevelt National Forest in Colorado. An initial phase of the research found vocal opposition to Forsythe II...

Author(s): Hannah Brenkert-Smith, Jody L. Jahn, Eric A. Vance, Juan Ahumada
Year Published: 2020
Type: Document

Coproduction of Wildland Fire Science: Models to transform the way fire science is applied - Final Report To Joint Fire Science Program

“Coproduction” as a transformative model for fire science application is receiving increasing attention as wildland fire managers face increasingly complex contexts for prescribed fire applications and wildfire suppression (Hiers 2017). Among natural resource disciplines, fire management was featured heavily in a recent call for...

Author(s): J. Morgan Varner, J. Kevin Hiers
Year Published: 2020
Type: Document

Fire Adapted Community

This document is a chapter within the Encyclopedia of Wildfires and Wildland-Urban Interface (WUI) Fires Living Edition. A fire adapted community (FAC) is comprised of residents, land management professionals, local politicians, emergency managers, and fire professionals who collaborate effectively to plan for, respond to, and...

Author(s): Travis B. Paveglio, Catrin Edgeley
Year Published: 2020
Type: Document

Tamm review: The effects of prescribed fire on wildfire regimes and impacts: A framework for comparison

Prescribed fire can result in significant benefits to ecosystems and society. Examples include improved wildlife habitat, enhanced biodiversity, reduced threat of destructive wildfire, and enhanced ecosystem resilience. Prescribed fire can also come with costs, such as reduced air quality and impacts to fire sensitive species. To...

Author(s): Molly E. Hunter, Marcos D. Robles
Year Published: 2020
Type: Document

Delivering effective savanna fire management for defined biodiversity conservation outcomes:
an Arnhem Land case study
www.nrfirescience.org/resource/21104
Given the recent history of frequent and extensive late dry season wildfire in Australia’s fire-prone northern savannas, regional conservation-based fire management programs typically aim to mitigate wildfire through the use of strategic prescribed burning during the cooler early dry season. However, it remains unclear as to the...
Author(s): Jay Evans, Jeremy Russell-Smith
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Reviewing fire, climate, deer, and foundation species as drivers of historically open oak and pine forests and transition to closed forests
www.nrfirescience.org/resource/22068
Historically open oak and pine savannas and woodlands have transitioned to closed forests comprised of increased numbers of tree species throughout the eastern United States. We reviewed evidence for and against a suite of previously postulated drivers of forest transition focused on (1) change in fire regimes, (2) increased...
Author(s): Brice B. Hanberry, Marc D. Abrams, Mary A. Arthur, J. Morgan Varner
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

A review of Indigenous knowledge and participation in environmental monitoring
www.nrfirescience.org/resource/21076
There is a growing interest by governments and academics in including Indigenous knowledge alongside scientific knowledge in environmental management, including monitoring. Given this growing interest, a critical review of how Indigenous peoples have been engaged in monitoring is needed. We reviewed and analyzed the academic...
Author(s): Kim-Ly Thompson, Trevor C. Lantz, Natalie C. Ban
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Landscape and Wildfires Seminary: Diagnosis and suppression, methodological advances
www.nrfirescience.org/resource/21839
In 2015, researchers from the U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station, Human Dimensions Program (hereafter U.S. Forest Service), and the University of Córdoba, Forest Engineering Department, Forest Fire Laboratory, Spain (hereafter University of Córdoba), entered into an official Memorandum of... 
Author(s): Francisco Rodriguez y Silva, Juan Ramón Molina Martínez, Matthew P. Thompson, Kit O'Connor
Year Published: 2020
Type: Document
Technical Report or White Paper

Cognitive maps reveal diverse perceptions of how prescribed fire affects forests and communities
www.nrfirescience.org/resource/21653
The potential for prescribed fire to address fuel management and forest restoration goals has received considerable attention. However, many wildfire risk mitigation practitioners and researchers consider
prescribed fire to be an underutilized tool for forest and fire management. Prescribed fire can affect a
broad range of values (e...

Managing for Fire Refugia in the Northwestern United States
www.nrfirescience.org/resource/19399
Fire refugia are defined as areas less frequently or less severely affected by wildfire relative to the
surrounding landscape and important for the persistence of biota. Land managers and researchers
were invited to participate in a two half-day workshop to gain insight on the factors that influence land
management strategies on...

Fire and Forest Management in Montane Forests of the Northwestern States and California, USA
www.nrfirescience.org/resource/19298
We reviewed forest management in the mountainous regions of several northwestern states and
California in the United States and how it has impacted current issues facing these forests. We focused
on the large-scale activities like fire suppression and logging which resulted in landscape level changes.
We divided the region into two...

Global wildland fire management research needs
www.nrfirescience.org/resource/20602
Purpose of Review: This review is on global wildland fire management research needs from the
standpoint of 'integrated fire management'. It seeks to apply a characterisation of fires to frame
research needs, and also recognise some differences in research needs between 'normal wildfires' and
'extreme wildfire events' and draw some...

Social vulnerability to large wildfires in the western USA
www.nrfirescience.org/resource/19925
Federal land managers in the US can be informed with quantitative assessments of the social
conditions of the populations affected by wildfires originating on their administered lands in order to
incorporate and adapt their management strategy to achieve a more targeted prioritization of
community wildfire protection investments. In...
Looking to the future: key points for sustainable management of northern Great Plains grasslands
www.nrfirescience.org/resource/20475
The grasslands of the northern Great Plains (NGP) region of North America are considered endangered ecosystems and priority conservation areas yet have great ecological and economic importance. Grasslands in the NGP are no longer self-regulating adaptive systems. The challenges to these grasslands are widespread and serious (e.g.,...
Author(s): Lora Perkins, Marissa A. Ahlering, Diane L. Larson
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Fighting flames and forging firelines: wildfire suppression effectiveness at the fire edge
www.nrfirescience.org/resource/19169
Purpose of Review: The effectiveness of wildfire suppression is difficult to define as it can be assessed against different objectives and at a range of scales. The influence of multiple variables make it a challenge to research. This two-part series presents a synthesis of the current understanding of the effectiveness of wildfire...
Author(s): Matt P. Plucinski
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

The ecological uncertainty of wildfire fuel breaks: examples from the sagebrush steppe
www.nrfirescience.org/resource/19738
Fuel breaks are increasingly being implemented at broad scales (100s to 10,000s of square kilometers) in fire-prone landscapes globally, yet there is little scientific information available regarding their ecological effects (e.g., habitat fragmentation). Fuel breaks are designed to reduce flammable vegetation (i.e., fuels), increase...
Author(s): Douglas J. Shinneman, Matthew J. Germino, David S. Pilliod, Cameron L. Aldridge, Nicole M. Vaillant, Peter S. Coates
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Characterizing the Role of Fluorocarbon and Hydrocarbon Surfactants in Firefighting-Foam Formulations for Fire-Suppression
www.nrfirescience.org/resource/20279
Fluorosurfactants used in current firefighting foams must be replaced with environmentally-friendly surfactants; however, current fluorine-free surfactants have subpar fire performance. Understanding how a surfactant affects fire performance of a foam is essential for developing new fluorine-free replacement surfactants. Surfactants...
Author(s): K. M. Hinnant, S. L. Giles, E. P. Smith, A. W. Snow, R. Ananth
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

International relations for reducing wildfire impacts – some history and some thoughts
www.nrfirescience.org/resource/19085
In this paper, we describe the international activities that FAO has undertaken with partners over the
years and then reflect on the role of international relations in reducing wildfire impacts on ecosystem services. FAO has long had a focus on wildfire management and been one of the international organizations facilitating the...
Author(s): Pieter van Lierop, Peter F. Moore
Year Published: 2019
Type: Document
Conference Proceedings

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
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

Making the Transition from Science Delivery to Knowledge Coproduction in boundary spanning: a case study of the Alaska Fire Science Consortium
www.nrfirescience.org/resource/20219
Boundary organizations facilitate two-way, sustained interaction and communication between research and practitioner spheres, deliver existing science, and develop new, actionable scientific information to address emerging social–ecological questions applicable to decision-making. There is an increasing emphasis on the role of...
Author(s): Melanie M. Colavito, Sarah F. Trainor, Nathan P. Kettle, Alison D. York
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Improving long-term fuel treatment effectiveness in the National Forest System through quantitative prioritization
www.nrfirescience.org/resource/19015
Predicting the efficacy of fuel treatments aimed at reducing high severity fire in dry-mixed conifer forests in the western US is a challenging problem that has been addressed in a variety of ways using both field observations and wildfire simulation models. One way to describe the efficacy of fuel treatments is to quantify how...
Author(s): Ana M. G. Barros, Alan A. Ager, Michelle A. Day, Palaiologos Palaiologou
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Tree regeneration following wildfires in the western US: a review
www.nrfirescience.org/resource/19570
Background: Wildfires, like many disturbances, can be catalysts for ecosystem change. Given projected climate change, tree regeneration declines and ecosystem shifts following severe wildfires are predicted. We reviewed scientific literature on post-fire tree regeneration to understand where and why no or few trees established. We...
Author(s): Camille Stevens-Rumann, Penelope Morgan
A Temporal Framework of Large Wildfire Suppression in Practice, a Qualitative Descriptive Study
www.nrfirescience.org/resource/20141
Suppression activities on large wildfires are complicated. Existing suppression literature does not take into account this complexity which leaves existing suppression models and measures of resource productivity incomplete. A qualitative descriptive analysis was performed on the suppression activities described in operational...
Author(s): Heather Simpson, Ross A. Bradstock, Owen F. Price
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Evidence of effectiveness in the Cohesive Strategy: measuring and improving wildfire response
www.nrfirescience.org/resource/19437
The United States' National Cohesive Wildfire Management Strategy aims to achieve greater social and ecological resilience to wildfire. It also raises the question: cohesive for whom and for what purpose? In this article, we address the wildfire response goal and what a cohesive response means. Namely, we define a cohesive response...
Author(s): Toddi A. Steelman, Branda Nowell
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Collaborations and capacities to transform fire management
www.nrfirescience.org/resource/20083
Wildfires bring stark attention to interactions among climate change, fire, forests, and livelihoods, prompting urgent calls for change from policy-makers and the public. Management options vary, but in many fire-adapted forests, the message from the scientific community is clear: Adapt to living with fire, reduce fuels and homes in...
Author(s): Courtney Schultz, Cassandra Moseley
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Designing operationally relevant daily large fire containment strategies using risk assessment results
www.nrfirescience.org/resource/19301
In this study, we aim to advance the optimization of daily large fire containment strategies for ground-based suppression resources by leveraging fire risk assessment results commonly used by fire managers in the western USA. We begin from an existing decision framework that spatially overlays fire risk assessment results with pre-...
Author(s): Yu Wei, Matthew P. Thompson, Joe H. Scott, Christopher D. O'Connor, Christopher J. Dunn
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
A landscape-scale optimisation model to break the hazardous fuel continuum while maintaining habitat quality
www.nrfirescience.org/resource/20022
Wildfires have demonstrated their destructive powers in several parts of the world in recent years. In an effort to mitigate the hazard of large catastrophic wildfires, a common practice is to reduce fuel loads in the landscape. This can be achieved through prescribed burning or mechanically. Prioritising areas to treat is a...
Author(s): Javier Leon, Victor M. J. J. Reijnders, John W. Hearne, Melih Ozlen, Karin J. Reinke
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Tamm Review: Reforestation for resilience in dry western US forests
www.nrfirescience.org/resource/19956
The increasing frequency and severity of fire and drought events have negatively impacted the capacity and success of reforestation efforts in many dry, western U.S. forests. Challenges to reforestation include the cost and safety concerns of replanting large areas of standing dead trees, and high seedling and sapling mortality...
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Climate, environment, and disturbance history govern resilience of western North American forests
www.nrfirescience.org/resource/20622
Before the advent of intensive forest management and fire suppression, western North American forests exhibited a naturally occurring resistance and resilience to wildfires and other disturbances. Resilience, which encompasses resistance, reflects the amount of disruption an ecosystem can withstand before its structure or...
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Adaptive Management and Monitoring
www.nrfirescience.org/resource/21248
This is a chapter in a technical report that is the second of two works describing longer-term actions to implement policies and strategies for preventing and suppressing rangeland fire and restoring rangeland landscapes affected by fire in the Western United States. The first part, Chambers et al 2017, "Science Framework for..."
Rethinking resilience to wildfire
www.nrfirescience.org/resource/19928
Record-breaking fire seasons are becoming increasingly common worldwide, and large wildfires are having extraordinary impacts on people and property, despite years of investments to support social–ecological resilience to wildfires. This has prompted new calls for land management and policy reforms as current land and fire...
Author(s): Dave McWethy, Tania L. Schoennagel, Philip E. Higuera, Meg A. Krawchuk, Brian J. Harvey, Elizabeth C. Metcalf, Courtney Schultz, Carol Miller, Alexander L. Metcalf, Brian Buma, Arika Virapongse, Judith C. Kulig, Richard C. Stedman, Zakary Ratajczak, Cara R. Nelson, Crystal A. Kolden
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A Double Whammy: Climate Change and Stand-Replacing Wildfires
www.nrfirescience.org/resource/20493
In the Intermountain region of the Western United States, most forested landscapes are fire prone and adapted to a semiarid climate. With the severity of wildfires increasing as a result of excessive fuels, land managers are concerned about forest converting to non-forest types such as shrubland or grassland. “And then when you...
Author(s): Rocky Mountain Research Station
Year Published: 2019
Type: Document
Research Brief or Fact Sheet

Social fragmentation and wildfire management: exploring the scale of adaptive action
www.nrfirescience.org/resource/19185
One overarching goal of United States fire management focuses on fostering human populations who can 'adapt' to wildfire as an unavoidable, reoccurring process operating in the landscapes where they live. The goal of creating 'fire adapted communities' is generally taken to mean that human populations can effectively prepare for....
Author(s): Travis B. Paveglio, Matthew S. Carroll, Amanda M. Stasiewicz, Catrin Edgeley
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Contrasting human influences and macro-environmental factors on fire activity inside and outside protected areas of North America
www.nrfirescience.org/resource/19770
Human activities threaten the effectiveness of protected areas (PAs) in achieving their conservation goals across the globe. In this study, we contrast the influence of human and macro-environmental factors driving fire activity inside and outside PAs. Using area burned between 1984 and 2014 for 11 ecoregions in Canada and the...
Author(s): Nicolas Mansuy, Carol Miller, Marc-Andre Parisien, Sean A. Parks, Enric Batllori, Max A. Moritz
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
Habitat use at fire edges: Does animal activity follow temporal patterns of habitat change?
www.nrfirescience.org/resource/20393
Edges are ecologically important environmental features that have been well researched in agricultural and urban landscapes. However, little work has been conducted in flammable ecosystems where spatially and temporally dynamic fire edges are expected to influence animal activity patterns, particularly for animals reliant on...
Author(s): Kate Parkins, Amy Scott, Julian Di Stefano, Matthew Swan, Holly Sitters, Alan York
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Contain and control: wildfire suppression effectiveness at incidents and across landscapes
www.nrfirescience.org/resource/19168
Purpose of Review: Containing and controlling wildfire incidents is one of the main functions of fire management. Understanding how this can be done effectively and efficiently informs many of the preparatory activities undertaken by fire management agencies to limit the impact of wildfires. This second article within a two-part...
Author(s): Matt P. Plucinski
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Wildfire prevention through prophylactic treatment of high-risk landscapes using viscoelastic retardant fluids
www.nrfirescience.org/resource/20273
Description Polyphosphate fire retardants are a critical tactical resource for fighting fires in the wildland and in the wildland–urban interface. Yet, application of these retardants is limited to emergency suppression strategies because current formulations cannot retain fire retardants on target vegetation for extended periods...
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Engaging the fire before it starts: A case study from the 2017 Pinal Fire (Arizona)
www.nrfirescience.org/resource/19069
How did the forest and community get to the point where they were willing to take on managing a fire of this size and duration for resource benefit and hazard reduction? Science has recognized for decades that many forested ecosystems of the American West are shifting away from historically fire-adapted conditions. Beginning in the...
Author(s): Christopher D. O’Connor, David E. Calkin
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Local public priorities and preferences for public land management in the Northern Region
www.nrfirescience.org/resource/21058
Local land managers are tasked with balancing the needs and preferences of local and national publics. This report provides a snapshot of preferences for local public land management and the demographics of communities within 50 miles of U.S. national forests and grasslands in the Northern Region of the U.S. Forest Service. This...

Author(s): Rebecca Rasch, Sarah M. McCaffrey
Year Published: 2019
Type: Document
Technical Report or White Paper

Fire regime and ecosystem responses: adaptive forest management in a changing world (Part 1)
www.nrfirescience.org/resource/19617
Although fire is an intrinsic factor in most terrestrial biomes, it is often perceived as a negative disturbance that must be suppressed. The application of successful fire prevention policies can lead to unsustainable fire events for ecosystems adapted to a specific fire regime. In addition, new climate and land use scenarios are...

Author(s): Daniel Moya, Giacomo Certini, Peter Z. Fule
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Resilience and fire management in the Anthropocene
www.nrfirescience.org/resource/20183
Fire management around the world is now undergoing extensive review, with a move toward fire management plans that maintain biodiversity and other ecosystems services, while at the same time mitigating the negative impacts to people and property. There is also increasing recognition of the historical and anthropogenic dimensions...

Author(s): Lindsey Gillson, Cathy L. Whitlock, Glynis Humphrey
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Beyond ICS: how should we govern complex disasters in the United States?
www.nrfirescience.org/resource/19567
The complexity of large-scale disasters requires governance structures that can integrate numerous responders quickly under often chaotic conditions. Complex disasters – by definition – span multiple jurisdictions and activate numerous response functions carried out by numerous legally autonomous public, nonprofit, and private...

Author(s): Branda Nowell, Toddi A. Steelman
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Mortality reconsidered: Testing and extending models of fire-induced tree mortality across the US - JFSP Final Report
www.nrfirescience.org/resource/20113
Predictive models of tree mortality and survival are vital for management planning and understanding fire effects in forests and woodlands, yet the underlying mechanisms of firecaused tree mortality remain poorly understood. This shortcoming limits the ability to accurately predict mortality and develop robust modelling...

Author(s): Sharon M. Hood, J. Morgan Varner, C. Alina Cansler
Year Published: 2019
A conservation paradox in the Great Basin-altering sagebrush landscapes with fuel breaks to reduce habitat loss from wildfire

www.nrfirescience.org/resource/17420

Interactions between fire and nonnative, annual plant species (that is, 'the grass/fire cycle') represent one of the greatest threats to sagebrush (Artemisia spp.) ecosystems and associated wildlife, including the greater sage-grouse (Centrocercus urophasianus). In 2015, U.S. Department of the Interior called for a 'science-based...'

Author(s): Douglas J. Shinneman, Cameron L. Aldridge, Peter S. Coates, Matthew J. Germino, David S. Pilliod, Nicole M. Vaillant

Year Published: 2018

Type: Document

Managing Wildfire for Whitebark Pine Ecosystem Restoration in western North America

www.nrfirescience.org/resource/18304

Wildfire in declining whitebark pine forests can be a tool for ecosystem restoration or an ecologically harmful event. This document presents a set of possible wildfire management practices for facilitating the restoration of whitebark pine across its range in Western North America. These management actions are designed to enhance...

Author(s): Robert E. Keane

Year Published: 2018

Type: Document

Use and benefits of NASA's RECOVER for post-fire decision support

www.nrfirescience.org/resource/18018

Today's extended fire seasons and large fire footprints have prompted state and federal land-management agencies to devote increasingly large portions of their budgets to wildfire management. As fire costs continue to rise, timely and comprehensive fire information becomes increasingly critical to response and rehabilitation...

Author(s): William Toombs, Keith T. Weber, Tesa Stegner, John L. Schnase, Eric Lindquist, Frances Lippitt

Year Published: 2018

Type: Document

2018 National Prescribed Fire Use Survey Report

www.nrfirescience.org/resource/19230

The National Association of State Foresters (NASF) and the Coalition of Prescribed Fire Councils (CPFC) worked collaboratively to produce the 2018 National Prescribed Fire Use Survey Report. Since 2012, this report has been compiled every three years, and is unique among fire surveys. Numerous surveys have been conducted that...

Author(s): Mark A. Melvin

Year Published: 2018

Type: Document

Technical Report or White Paper
Rethinking the wildland fire management system
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

A model-based framework to evaluate alternative wildfire suppression strategies
www.nrfirescience.org/resource/16478
The complexity and demands of wildland firefighting in the western U.S. have increased over recent decades due to factors including the expansion of the wildland-urban interface, lengthening fire seasons associated with climate change, and changes in vegetation due to past fire suppression and timber harvest. In light of these...
Author(s): Karen L. Riley, Matthew P. Thompson, Joe H. Scott, Julie W. Gilbertson-Day
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Decision Support Approaches in Adaptive Forest Management
www.nrfirescience.org/resource/17655
Climate and social changes place strong demands on forest managers. Forest managers need powerful approaches and tools, which could help them to be able to react to the rapidly changing conditions. However, the complexity of quantifying forest ecosystems services as well as the complexity of current decision theories, technologies...
Author(s): Jan Kaspar, Pete Bettinger, Harald Vacik, Robert Marusak, Jordi Garcia-Gonzalo
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Severe fire weather and intensive forest management increase fire severity in a multi?ownership landscape
www.nrfirescience.org/resource/17571
Many studies have examined how fuels, topography, climate, and fire weather influence fire severity. Less is known about how different forest management practices influence fire severity in multi?owner landscapes, despite costly and controversial suppression of wildfires that do not acknowledge ownership boundaries. In 2013, the...
Author(s): Harold S. Zald, Christopher J. Dunn
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Proceedings of the IUFRO joint conference: Genetics of five-needle pines, rusts of forest trees, and Strobusphere
www.nrfirescience.org/resource/17556
Proceedings from the 2014 IUFRO Joint Conference: Genetics of five-needle pines, rusts of forest trees, and Strobusphere in Fort Collins, Colorado. The published proceedings include 91 papers
pertaining to research conducted on the genetics and pathology of five-needle pines and rusts of forest trees. Topic areas are: ecology and...

**Year Published:** 2018
**Type:** Document
**Technical Report or White Paper**

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**Advancing Fire Science with Large Forest Plots and a Long-Term Multidisciplinary Approach**

[www.nrfirescience.org/resource/17105](www.nrfirescience.org/resource/17105)

Large, spatially explicit forest plots have the potential to address currently understudied aspects of fire ecology and management, including the validation of physics-based fire behavior models and next-generation fire effects models. Pre-fire forest structures, fire-mediated mortality, and post-fire forest development can be...

**Author(s):** James A. Lutz, Andrew J. Larson, Mark E. Swanson
**Year Published:** 2018
**Type:** Document
**Book or Chapter or Journal Article**

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**Can Air Quality Management Drive Sustainable Fuels Management at the Temperate Wildland–Urban Interface?**

[www.nrfirescience.org/resource/18137](www.nrfirescience.org/resource/18137)

Sustainable fire management has eluded all industrial societies. Given the growing number and magnitude of wildfire events, prescribed fire is being increasingly promoted as the key to reducing wildfire risk. However, smoke from prescribed fires can adversely affect public health. We propose that the application of air quality...

**Author(s):** David M. J. S. Bowman, Lori D. Daniels, Fay H. Johnston, Grant J. Williamson, William Matt Jolly, Sheryl Magzamen, Ana G. Rappold, Michael Brauer, Sarah B. Henderson
**Year Published:** 2018
**Type:** Document
**Book or Chapter or Journal Article**

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**Wildfire fuel management: network-based models and optimization of prescribed burning**

[www.nrfirescience.org/resource/17866](www.nrfirescience.org/resource/17866)

Wildfires are a common phenomenon on most continents. They have occurred for an estimated 60 million years and are part of a regular climatic cycle. Nevertheless, wildfires represent a real and continuing problem that can have a major impact on people, wildlife and the environment. The intensity and severity of wildfires can be...

**Author(s):** Dmytro Matsypura, Oleg A. Prokopyev, Aizat Zahar
**Year Published:** 2018
**Type:** Document
**Book or Chapter or Journal Article**

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**FIRE-BIRD: A GIS-based toolset for applying habitat suitability models to inform land management planning**

[www.nrfirescience.org/resource/22087](www.nrfirescience.org/resource/22087)

Habitat suitability models can inform forest management for species of conservation concern. Models quantify relationships between known species locations and environmental attributes, which are used to identify areas most likely to support species of concern. Managers can then limit negative human impacts in areas of high...

**Author(s):** Quresh Latif, Victoria A. Saab, Jessica R. Haas, Jonathan G. Dudley
**Year Published:** 2018
**Type:** Document
Technical Report or White Paper

Spatiotemporal patterns of unburned areas within fire perimeters in the northwestern United States from 1984 to 2014

www.nrfirescience.org/resource/16632

A warming climate, fire exclusion, and land cover changes are altering the conditions that produced historical fire regimes and facilitating increased recent wildfire activity in the northwestern United States. Understanding the impacts of changing fire regimes on forest recruitment and succession, species distributions, carbon...

Author(s): Arjan J. H. Meddens, Crystal A. Kolden, James A. Lutz, John T. Abatzoglou
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Marshall Woods Restoration Project - Challenges to building consensus and conveying fire hazard mitigation and ecological restoration needs to the public

www.nrfirescience.org/resource/19686

The 28,000-acre Rattlesnake National Recreation Area (RNRA) lies immediately northwest of Missoula, Montana, and is a highly popular recreation destination with an estimated 60,000 annual visitors. The immediate area also contains thousands of residences situated within the Wildland Urban Interface (WUI). In 2005, Missoula County’...

Author(s): Megan P. Keville
Year Published: 2018
Type: Document
Research Brief or Fact Sheet

Collaborative restoration effects on forest structure in ponderosa pine-dominated forests of Colorado

www.nrfirescience.org/resource/17786

In response to large, severe wildfires in historically fire-adapted forests in the western US, policy initiatives, such as the USDA Forest Service’s Collaborative Forest Landscape Restoration Program (CFLRP), seek to increase the pace and scale of ecological restoration. One required component of this program is collaborative...

Author(s): Jeffery B. Cannon, Kevin J. Barrett, Benjamin Gannon, Rob Addington, Michael A. Battaglia, Paula J. Fornwalt, Gregory H. Aplet, Anthony S. Cheng, Jeffrey L. Underhill, Jennifer S. Briggs, Peter M. Brown
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

The Challenge of Diffusion in Forest Plans: A Methodological Proposal and Case Study

www.nrfirescience.org/resource/17627

Society’s participation in decisions regarding land planning and management is essential for reaching viable and long-lasting solutions. The success of forest plans depends on the involvement of different stakeholders. In turn, stakeholder involvement depends on the representativity achieved in public participation in the...

Author(s): Xabier Bruña-García, Manuel F. Marey-Pérez
Year Published: 2018
Type: Document
Book or Chapter or Journal Article
Appropriate Sample Sizes for Monitoring Burned Pastures in Sagebrush Steppe: How Many Plots are Enough, and Can One Size Fit All?

Statistically defensible information on vegetation conditions is needed to guide rangeland management decisions following disturbances such as wildfire, often for heterogeneous pastures. Here we evaluate sampling effort needed to achieve a robust statistical threshold using > 2000 plots sampled on the 2015 Soda Fire that burned...

Author(s): Cara Applestein, Matthew J. Germino, David S. Pilliod, Matthew R. Fisk, Robert S. Arkle
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Restoration of the iconic Pando aspen clone: emerging evidence of recovery

Quaking aspen (Populus tremuloides Michx.) is being stressed across the America West from a variety of sources including drought, herbivory, fire suppression, development, and past management practices. Rich assemblages of plants and animals that utilize aspen forests, as well as economic values of tourism, grazing, hunting,...

Author(s): Paul C. Rogers, Jody A. Gale
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Adapt to more wildfire in western North American forests as climate changes

Wildfires across western North America have increased in number and size over the past three decades, and this trend will continue in response to further warming. As a consequence, the wildland–urban interface is projected to experience substantially higher risk of climate-driven fires in the coming decades. Although many plants,...

Author(s): Tania L. Schoennagel, Jennifer Balch, Hannah Brenkert-Smith, Philip E. Dennison, Brian J. Harvey, Meg A. Krawchuk, Nathan Mietkiewicz, Penelope Morgan, Max A. Moritz, Ray Rasker, Monica G. Turner, Cathy L. Whitlock
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Studying interregional wildland fire engine assignments for large fire suppression

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

Wildland fire risk reduction: a Government Accountability Office report

Wildland fire risk reduction: a Government Accountability Office report
This report examines federal officials' and stakeholders' views on (1) factors that affect federal-nonfederal collaboration aimed at reducing wildland fire risk to communities and (2) actions that could improve their ability to reduce risk to communities.

Author(s): U.S. Government Accountability Office
Year Published: 2017
Type: Document
Technical Report or White Paper

The influence of incident management teams on the deployment of wildfire suppression resources
www.nrfirescience.org/resource/15494
Despite large commitments of personnel and equipment to wildfire suppression, relatively little is known about the factors that affect how many resources are ordered and assigned to wildfire incidents and the variation in resources across incident management teams (IMTs). Using detailed data on suppression resource assignments for...
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Adaptive silviculture for climate change: a national experiment in manager-scientist partnerships to apply an adaptation framework
www.nrfirescience.org/resource/15232
Forest managers in the United States must respond to the need for climate-adaptive strategies in the face of observed and projected climatic changes. However, there is a lack of on-the-ground forest adaptation research to indicate what adaptation measures or tactics might be effective in preparing forest ecosystems to deal with...
Author(s): Linda Nagel, Brian J. Palik, Michael A. Battaglia, Anthony W. D'Amato, James M. Guldin, Christopher W. Swanston, Maria K. Janowiak, Matthew P. Powers, Linda A. Joyce, Constance I. Millar, David L. Peterson, Lisa Ganio, Chad Kirschbaum, Molly R. Roske
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
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

Spatiotemporal dynamics of simulated wildfire, forest management, and forest succession in central Oregon, USA
www.nrfirescience.org/resource/15134
We use the simulation model Envision to analyze long-term wildfire dynamics and the effects of different fuel management scenarios in central Oregon, USA. We simulated a 50-year future where fuel management activities were increased by doubling and tripling the current area treated while retaining...
existing treatment strategies in...
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Where you stand depends on where you sit: Qualitative inquiry into notions of fire adaptation
www.nrfirescience.org/resource/16190
Wildfire and the threat it poses to society represents an example of the complex, dynamic relationship between social and ecological systems. Increasingly, wildfire adaptation is posited as a pathway to shift the approach to fire from a suppression paradigm that seeks to control fire to a paradigm that focuses on "living with"...
Author(s): Hannah Brenkert-Smith, James R. Meldrum, Patricia A. Champ, Christopher M. Barth
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

All lands approaches to fire management in the Pacific West: a typology
www.nrfirescience.org/resource/15125
Since 2009, the US Department of Agriculture Forest Service has promoted an “all lands approach” to forest restoration, particularly relevant in the context of managing wildfire. To characterize its implementation, we undertook an inventory of what we refer to as fire-focused all lands management (ALM) projects, defined as...
Author(s): Susan Charnley, Erin C. Kelly, Kendra L. Wendel
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Targeted woodland removal to recover at-risk grouse and their sagebrush-steppe and prairie ecosystems
www.nrfirescience.org/resource/14924
In this paper, we summarize key findings from a special issue of the journal Rangeland Ecology & Management examining socioecological aspects of woodland expansion and management actions to address this threat in sagebrush and prairie ecosystems. We highlight species and ecosystem outcomes that may result from recent...
Author(s): Richard F. Miller, David E. Naugle, Jeremy D. Maestas, Christian A. Hagen, Galon Hall
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

A century of wildland fire research: contributions to long-term approaches for wildland fire management
www.nrfirescience.org/resource/15542
This proceedings of a workshop summarizes presentations and discussions on ways in which science can help wildland fire planning and management be more strategic, reduce costs, and ultimately increase resilience to wildland fire, both on the land and in communities affected by fire. Its organization follows the structure of the...
Year Published: 2017
Type: Document
Conference Proceedings
A simulation and optimisation procedure to model daily suppression resource transfers during a fire season in Colorado
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

Landowner guide to sage-grouse conservation in Wyoming
www.nrfirescience.org/resource/15280
Sagebrush ecosystems are complex and so are the efforts to conserve sage-grouse. Those who own or manage sage-grouse habitat play a critical role in conserving this species in Wyoming, and this guide is intended to provide a concise source of science-based information about the greater sage-grouse and the habitat required for its...
Author(s): Leanne L. Correll, Rebecca M. Burton, John Derek Scasta, Jeffrey L. Beck
Year Published: 2017
Type: Document
Management or Planning Document

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

Pando’s lessons: restoration of a giant aspen clone
www.nrfirescience.org/resource/16378
A 106 acre (43 ha) aspen clone lives in the Fishlake National Forest in south-central Utah. Clones are comprised of multiple aspen stems, called ramets, which are genetically identical. This particular colony of ramets was named “Pando” (Latin for “I spread”) by researchers believing it to be the largest living organism on...
Year Published: 2017
Type: Document
Research Brief or Fact Sheet

Diversity in forest management to reduce wildfire losses
www.nrfirescience.org/resource/15210
This study investigates how federal, state, and private corporate forest owners in a fire-prone landscape of southcentral Oregon manage their forests to reduce wildfire hazard and loss to high-severity wildfire.
We evaluate the implications of our findings for concepts of social–ecological resilience. Using interview data, we...

Author(s): Susan Charnley, Thomas A. Spies, Ana M. G. Barros, Eric M. White, Keith A. Olsen
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Using an agent-based model to examine forest management outcomes in a fire-prone landscape in Oregon, USA
www.nrfirescience.org/resource/15133
Fire-prone landscapes present many challenges for both managers and policy makers in developing adaptive behaviors and institutions. We used a coupled human and natural systems framework and an agent-based landscape model to examine how alternative management scenarios affect fire and ecosystem services metrics in a fire-prone...

Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Opportunities to utilize traditional phenological knowledge to support adaptive management of social-ecological systems vulnerable to changes in climate and fire regimes
www.nrfirescience.org/resource/13956
The field of adaptive management has been embraced by researchers and managers in the United States as an approach to improve natural resource stewardship in the face of uncertainty and complex environmental problems. Integrating multiple knowledge sources and feedback mechanisms is an important step in this approach. Our objective...

Author(s): Christopher A. Armatas, Tyron J. Venn, Brooke Baldauf McBride, Alan E. Watson, Stephen J. Carver
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Long-term post-disturbance forest recovery in the Greater Yellowstone Ecosystem analyzed using landsat time series stack
www.nrfirescience.org/resource/14826
Forest recovery from past disturbance is an integral process of ecosystem carbon cycles, and remote sensing provides an effective tool for tracking forest disturbance and recovery over large areas. Although the disturbance products (tracking the conversion from forest to non-forest type) derived using the Landsat Time Series Stack-...

Author(s): Feng R. Zhao, Ran Meng, Chengquan Huang, Maosheng Zhao, Feng A. Zhao, Peng Gong, Zhiliang Zhu, Le Yu
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Resolving future fire management conflicts using multicriteria decision making
www.nrfirescience.org/resource/13893
Management strategies to reduce the risks to human life and property from wildfire commonly involve burning native vegetation. However, planned burning can conflict with other societal objectives such as
human health and biodiversity conservation. These conflicts are likely to intensify as fire regimes change under future climates...

Author(s): Don A. Driscoll, Michael Bode, Ross A. Bradstock, David A. Keith, Trent D. Penman, Owen F. Price
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Conserving whitebark pine in ski areas - Demonstrations at Whitefish Mountain Resort
www.nrfirescience.org/resource/14705
As part of the Whitebark Pine Ecosystem Foundation’s Annual Science and Management Workshop - Successes and Challenges in Managing the Jewel in the Crown of the Continent, participants saw first hand some of the challenges facing whitebark pine restoration, and they witnessed certification of the first Whitebark Pine Friendly Ski...
Author(s): Corey L. Gucker
Year Published: 2016
Type: Document
Research Brief or Fact Sheet

Achievable future conditions as a framework for guiding forest conservation and management
www.nrfirescience.org/resource/13788
We contend that traditional approaches to forest conservation and management will be inadequate given the predicted scale of social-economic and biophysical changes in the 21st century. New approaches, focused on anticipating and guiding ecological responses to change, are urgently needed to ensure the full value of forest ecosystem...
Author(s): Stephen W. Golladay, Katherine L. Martin, James M. Vose, David N. Wear, Alan P. Covich, Richard J. Hobbs, Kier D. Klepzig, Gene E. Likens, Robert J. Naiman, Allan W. Shearer
Year Published: 2016
Type: Document
Book or Chapter or Journal Article, Synthesis

Fire legacies impact conifer regeneration across environmental gradients in U.S. northern Rockies
www.nrfirescience.org/resource/19946
Context: An increase in the incidence of large wildfires worldwide has prompted concerns about the resilience of forest ecosystems, particularly in the western U.S., where recent changes are linked with climate warming and 20th-century land management practices. Objectives: To study forest resilience to recent wildfires, we...
Author(s): Kerry Kemp, Philip E. Higuera, Penelope Morgan
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Avian community responses to post-fire forest structure: implications for fire management in mixed conifer forests
www.nrfirescience.org/resource/22078
Fire is a natural process and the dominant disturbance shaping plant and animal communities in many coniferous forests of the western US. Given that fire size and severity are predicted to increase in the future, it has become increasingly important to understand how wildlife responds to fire and post-fire management. The Angora...
Author(s): Angela M. White, Patricia N. Manley, Gina L. Tarbill, T. Will Richardson, Robin E. Russell,
Should scientists be required to use a model-based solution to adjust for possible distance-based detectability bias?
www.nrfirescience.org/resource/14590
The most popular method used to gain an understanding of population trends or of differences in bird abundance among land condition categories is to use information derived from point counts. Unfortunately, various factors can affect one’s ability to detect birds, and those factors need to be controlled or accounted for so that any...
Author(s): Richard L. Hutto
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Smoke management photographic guide: a visual aid for communicating impacts
www.nrfirescience.org/resource/14538
Communicating emissions impacts to the public can sometimes be difficult because quantitatively conveying smoke concentrations is complicated. Regulators and land managers often refer to particulate-matter concentrations in micrograms per cubic meter, but this may not be intuitive or meaningful to everyone. The primary purpose of...
Author(s): Joshua C. Hyde, Jarod Blades, Troy E. Hall, Roger D. Ottmar, Alistair M. S. Smith
Year Published: 2016
Type: Document
Technical Report or White Paper

Administrative and judicial review of NEPA decisions: risk factors and risk minimizing strategies for the Forest Service
www.nrfirescience.org/resource/14463
Changes in land use and management practices throughout the past century—in addition to drought and other stressors exacerbated by climate change—have degraded the nation’s forests and led to overgrowth and accumulation of hazardous fuels (GAO 2015). Because of these fuels, some forests now see high-severity fires that...
Author(s): Audrey Bixler, R. Patrick Bixler, Autumn Ellison, Cassandra Moseley
Year Published: 2016
Type: Document
Synthesis

Complex challenges of maintaining whitebark pine in Greater Yellowstone under climate change: A call for innovative research, management, and policy approaches
www.nrfirescience.org/resource/14364
Climate suitability is projected to decline for many subalpine species, raising questions about managing species under a deteriorating climate. Whitebark pine (WBP) (Pinus albicaulis) in the Greater Yellowstone Ecosystem (GYE) crystallizes the challenges that natural resource managers of many high mountain ecosystems will likely face...
Author(s): Andrew J. Hansen, Kathryn Ireland, Kristin Legg, Robert E. Keane, Edward Barge, Martha Jenkins, Michiel Pillet
Year Published: 2016
Type: Document
Wildland fire: nature's fuel treatment (spotlight)

RMRS Scientists have evaluated more than 40 years of satellite imagery to determine what happens when a fire burns into a previously burned area. Results from this research are helping land managers to assess whether a previous wildland fire will act as a fuel treatment based on the length of time since the previous fire occurred,...

Author(s): Sean A. Parks, Carol Miller
Year Published: 2016
Type: Document
Research Brief or Fact Sheet

From ideas to action: a guide to funding and authorities for collaborative forestry

For 15 years, the Rural Voices for Conservation Coalition (RVCC) has successfully advocated for the expansion and improvement of federal policies that support stewardship and restoration on public and private lands. An All Lands approach to collaborative stewardship recognizes the social, ecological, and...

Author(s): Rebecca Shively, Karen Hardigg, Rachel Plawecki
Year Published: 2016
Type: Document
Technical Report or White Paper

Insights from wildfire science: a resource for fire policy discussions

Record blazes swept across parts of the US in 2015, burning more than 10 million acres. The four biggest fire seasons since 1960 have all occurred in the last 10 years, leading to fears of a ‘new normal’ for wildfire. Fire fighters and forest managers are overwhelmed, and it is clear that the policy and management approaches of...

Author(s): Tania L. Schoennagel, Penelope Morgan, Jennifer Balch, Philip E. Dennison, Brian J. Harvey, Richard L. Hutto, Meg A. Krawchuk, Max A. Moritz, Ray Rasker, Cathy L. Whitlock
Year Published: 2016
Type: Document
Technical Report or White Paper

Local capacity for integrated forest and wildfire management

The purpose of this document is to examine how some organizations have developed local, cross-trained workforces to address wildfire risks alongside intensifying wildfire management needs. We conducted case studies of four organizations in the western United States that have found ways to successfully...

Author(s): Heidi Huber-Stearns, Cassandra Moseley, Nick Goulette
Year Published: 2016
Type: Document
Technical Report or White Paper

Is ‘resilience’ maladaptive? Towards an accurate lexicon for climate change adaptation

Climate change adaptation is a rapidly evolving field in conservation biology and includes a range of...
strategies from resisting to actively directing change on the landscape. The term ‘climate change resilience,’ frequently used to characterize adaptation strategies, deserves closer scrutiny because it is ambiguous, often...

Author(s): Nicholas A. Fisichelli, Gregor W. Schuurman, Cat Hawkins Hoffman
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Facilitating knowledge transfer between researchers and wildfire practitioners about trust: an international case study

www.nrfirescience.org/resource/14605
The importance of knowledge transfer between researchers, policy makers and practitioners is widely recognized. However, barriers to knowledge transfer can make it difficult for practitioners to apply the results of scientific research. This paper describes a project that addressed barriers to knowledge transfer by involving...

Author(s): Tara K. McGee, Allan Curtis, Bonita McFarlane, Bruce A. Shindler, Amy Christianson, Christine Olsen, Sarah M. McCaffrey
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Conservation and management of whitebark pine ecosystems

www.nrfirescience.org/resource/14563
This reference presents general guidelines for planning, implementing, and evaluating whitebark pine conservation and management activities on lands administered by the Bureau of Land Management.

Author(s): Dana L. Perkins, Robert E. Means, Alexia C. Cochrane
Year Published: 2016
Type: Document
Synthesis, Technical Report or White Paper

Cascading effects of fire retardant on plant-microbe interactions, community composition, and invasion

www.nrfirescience.org/resource/14485
Climate change, historical fire suppression, and a rise in human movements in urban-forest boundaries have resulted in an increased use of long-term fire retardant (LTFR). While LTFR is an effective fire-fighting tool, it contains high concentrations of nitrogen and phosphorus, and little is known about how this nutrient pulse...

Author(s): Abigail Marshall, Lauren Waller, Ylva Lekberg
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Engaging communities and climate change futures with Multi-Scale, Iterative Scenario Building (MISB) in the western United States

www.nrfirescience.org/resource/14428
Current projections of future climate change foretell potentially transformative ecological changes that threaten communities globally. Using two case studies from the United States Intermountain West, this article highlights the ways in which a better articulation between theory and methods in research design can generate proactive...

Author(s): Daniel Murphy, Carina Wyborn, Laurie Yung, Daniel R. Williams, Cory Cleveland, Lisa A. Eby, Solomon Z. Dobrowski, Erin Towler
Using resilience and resistance concepts to manage threats to sagebrush ecosystems, Gunnison sage-grouse, and Greater sage-grouse in their eastern range: a strategic multi-scale approach
www.nrfirescience.org/resource/14967
This report provides a strategic approach developed by a Western Association of Fish and Wildlife Agencies interagency working group for conservation of sagebrush ecosystems, Greater sage-grouse, and Gunnison sage-grouse. It uses information on (1) factors that influence sagebrush ecosystem resilience to disturbance and resistance...
Year Published: 2016
Type: Document
Technical Report or White Paper

Empirical Support for the Use of Prescribed Burning
www.nrfirescience.org/resource/19974
Prescribed burning as a fuel treatment seeks to moderate wildfire impacts and decreases the areal extent of wildfires by increasing the effectiveness of fire suppression. Assessment of prescribed burning effectiveness is frequently anecdotal or based on simulation. This paper examines recent observational evidence of prescribed fire...
Author(s): Paulo M. Fernandes
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Forest structure and species traits mediate projected recruitment declines in western US tree species
www.nrfirescience.org/resource/15644
ABSTRACT Aim: Determine if differences in the climatic niche between conspecific adult and juvenile trees of the western United States vary by species traits and to assess if forest canopies moderate the sensitivity of juvenile trees to climatic variation. Location: The western United States. Methods: Using data from the USDA...
Author(s): Solomon Z. Dobrowski, Alan Swanson, John T. Abatzoglou, Zachary A. Holden, Hugh Safford, Michael K. Schwartz, Daniel G. Gavin
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Tracking progress - The monitoring process used in collaborative forest landscape restoration projects in the Pacific Northwest
www.nrfirescience.org/resource/13348
Several trends have emerged in recent years that affect the management of the National Forest System, particularly in the western U.S. One is the recognition of landscapes departed from a natural range of variation, especially with implications for wildfire management. Another trend is the economic...
Author(s): Thomas DeMeo, Amy Markus, Bernard Bormann, Jodi Leingang
Effect of fire prevention programs on accidental and incendiary wildfires on tribal lands in the United States
www.nrfirescience.org/resource/13177
Humans cause more than 55% of wildfires on lands managed by the USDA Forest Service and US Department of the Interior, contributing to both suppression expenditures and damages. One means to reduce the expenditures and damages associated with these wildfires is through fire prevention activities, which can include burn permits,...
Author(s): Karen L. Abt, David T. Butry, Jeffrey P. Prestemon, Samuel Scranton
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Strategic operations planning-it's not just for wilderness! How the strategic operations planner can help
www.nrfirescience.org/resource/14609
The Strategic Operational Planner (SOPL) wildland fire management position was created in the United States in 2009 to reflect updated terminology. SOPL merges the former Fire Use Manager positions (FUM1 and FUM2) and is now an established position within the Incident Command System. Traditionally, the FUM positions and the SOPL...
Author(s): Charles W. McHugh, Stu Hoyt, Brett Fay
Year Published: 2015
Type: Document
Technical Report or White Paper

Determination of the smoke-plume heights and their dynamics with ground-based scanning LIDAR
www.nrfirescience.org/resource/13611
Lidar-data processing techniques are analyzed, which allow determining smoke-plume heights and their dynamics and can be helpful for the improvement of smoke dispersion and air quality models. The data processing algorithms considered in the paper are based on the analysis of two alternative characteristics related to the smoke...
Author(s): Vladimir A. Kovalev, Alexander P. Petkov, Cyle E. Wold, Shawn P. Urbanski, Wei Min Hao
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

The role of fire in aspen ecology and restoration
www.nrfirescience.org/resource/16377
Quaking aspen is generally considered to be a fire-adapted species because it regenerates prolifically after fire, and it can be replaced by more shade-tolerant tree species in the absence of fire. As early-successional aspen stands transition to greater conifer-dominance, they become increasingly fire prone, until fire returns, and...
Author(s): Douglas J. Shinneman, Kevin Krasnow, Susan K. McIlroy
Year Published: 2015
Type: Document
Research Brief or Fact Sheet
Are high-severity fires burning at much higher rates recently than historically in dry-forest landscapes of the western USA?

www.nrfirescience.org/resource/13487

Dry forests at low elevations in temperate-zone mountains are commonly hypothesized to be at risk of exceptional rates of severe fire from climatic change and land-use effects. Their setting is fire-prone, they have been altered by land-uses, and fire severity may be increasing. However, where fires were excluded, increased fire...

Author(s): William L. Baker
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Principles of effective USA federal fire management plans

www.nrfirescience.org/resource/13454

Federal fire management plans are essential implementation guides for the management of wildland fire on federal lands. Recent changes in federal fire policy implementation guidance and fire science information suggest the need for substantial changes in federal fire management plans of the United States. Federal land management...

Author(s): Marc D. Meyer, Susan L. Roberts, Robin Wills, Matthew L. Brooks, Eric M. Winford
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Simulated big sagebrush regeneration supports predicted changes at the trailing and leading edges of distribution shifts

www.nrfirescience.org/resource/15432

Many semi-arid plant communities in western North America are dominated by big sagebrush. These ecosystems are being reduced in extent and quality due to economic development, invasive species, and climate change. These pervasive modifications have generated concern about the long-term viability of sagebrush habitat and sagebrush...

Author(s): Daniel Schlaepfer, Kyle A. Taylor, Victoria E. Pennington, Kellen N. Nelson, Trace E. Martyn, Caitlin M. Rottler, William Lauenroth, John Bradford
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

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

www.nrfirescience.org/resource/13262

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

Author(s): Jia C. Liu, Gavin Pereira, Sarah A. Uhl, Mercedes Bravo, Michelle L. Bell
Year Published: 2015
Type: Document
Synthesis

Representing climate, disturbance, and vegetation interactions in landscape models

www.nrfirescience.org/resource/13639
The prospect of rapidly changing climates over the next century calls for methods to predict their effects on myriad, interactive ecosystem processes. Spatially explicit models that simulate ecosystem dynamics at fine (plant, stand) to coarse (regional, global) scales are indispensable tools for meeting this challenge under a...

Author(s): Robert E. Keane, Donald McKenzie, Donald A. Falk, Erica A. H. Smithwick, Carol Miller, Lara-Karena B. Kellogg
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Keeping it wild 2: an updated interagency strategy to monitor trends in wilderness character across the National Wilderness Preservation System

Keeping It Wild 2 is an interagency strategy to monitor trends in selected attributes of wilderness character based on lessons learned from 15 years of developing and implementing wilderness character monitoring across the National Wilderness Preservation System. This document updates and replaces Keeping It Wild: An Interagency...

Author(s): Peter Landres, Chris Barns, Steve Boutcher, Tim Devine, Peter Dratch, Adrienne Lindholm, Linda Merigliano, Nancy Roeper, Emily Simpson
Year Published: 2015
Type: Document
Technical Report or White Paper

Temperate forest health in an era of emerging megadisturbance

Although disturbances such as fire and native insects can contribute to natural dynamics of forest health, exceptional droughts, directly and in combination with other disturbance factors, are pushing some temperate forests beyond thresholds of sustainability. Interactions from increasing temperatures, drought, native insects and...

Author(s): Constance I. Millar, Nathan L. Stephenson
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Managing ungulate browsing for sustainable aspen

In montane forests of the Intermountain West composition and function are often defined by what happens with quaking aspen. Aspen is a pioneer species that regenerates quickly following disturbance and then establishes ecological conditions under which the rest of the biological community develops. Quaking aspen forests have high...

Author(s): Samuel B. St. Clair, Paul C. Rogers, Michael R. Kuhns
Year Published: 2015
Type: Document
Research Brief or Fact Sheet

Effects of post-fire salvage logging and a skid trail treatment on ground cover, soils, and sediment production in the interior western United States

Post-fire salvage logging adds another set of environmental effects to recently burned areas, and previous studies have reported varying impacts on vegetation, soil disturbance, and sediment production with limited data on the underlying processes. Our objectives were to determine how: (1)
Prescribed fire effects on resource selection by cattle in mesic sagebrush steppe. part 1: spring grazing
www.nrfirescience.org/resource/12148
Prescribed fire is commonly applied world-wide as a tool for enhancing habitats and altering resource-selection patterns of grazing animals. A scientific basis for this practice has been established in some ecosystems but its efficacy has not been rigorously evaluated on mesic sagebrush steppe. Beginning in 2003, resource-selection...
Author(s): Patrick E. Clark, Jaechoul Lee, Kyungduk Ko, Ryan M. Nielson, Douglas E. Johnson, David C. Ganskopp, Joe Chigbrow, Frederick B. Pierson, Stuart P. Hardegree
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Restoration fuels treatments in old-growth- Visiting research plots in western larch and ponderosa pine forests
www.nrfirescience.org/resource/12674
Mick Harrington and Steve Arno, retired research foresters with the USFS Rocky Mountain Research Station, took participants of the May 2014 Large Wildland Fires Conference through a 300-year-old stand of ponderosa pine (Pinus ponderosa) and western larch (Larix occidentalis). While there, they discussed their research, which...
Author(s): Corey L. Gucker
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Resistance and resilience: a conceptual framework for silviculture
www.nrfirescience.org/resource/16862
Increasingly, forest management goals include building or maintaining resistance and/or resilience to disturbances in the face of climate change. Although a multitude of descriptive definitions for resistance and resilience exist, to evaluate whether specific management activities (silviculture) are effective, prescriptive...
Author(s): R. Justin DeRose, James N. Long
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Semiarid rangeland is resilient to summer fire and postfire grazing utilization
www.nrfirescience.org/resource/12050
Most wildfires occur during summer in the northern hemisphere, the area burned annually is increasing, and fire effects during this season are least understood. Understanding plant response to grazing following summer fire is required to reduce ecological and financial risks associated with wildfire. Forty 0.75-ha plots were...
Author(s): Lance T. Vermeire, Jessica L. Crowder, David B. Wester
Year Published: 2014
Management for mountain pine beetle outbreak suppression: does relevant science support current policy?
www.nrfirescience.org/resource/13571
While the use of timber harvests is generally accepted as an effective approach to controlling bark beetles during outbreaks, in reality there has been a dearth of monitoring to assess outcomes, and failures are often not reported. Additionally, few studies have focused on how these treatments affect forest structure and function...
Author(s): Diana L. Six, Eric Biber, Elisabeth Long
Year Published: 2014
Type: Document
Book or Chapter or Journal Article, Synthesis

Linking environmental research and practice: lessons from the integration of climate science and water management in the western United States
www.nrfirescience.org/resource/12626
Efforts to better connect scientific research with people and organizations involved in environmental decision making are receiving increased interest and attention. Some of the challenges we currently face, however—including complex questions associated with climate change—are unlike most of the environmental issues encountered...
Author(s): Daniel B. Ferguson, Jennifer Rice, Connie Woodhouse
Year Published: 2014
Type: Document
Synthesis, Technical Report or White Paper

Challenges and opportunities for large landscape-scale management in a shifting climate: the importance of nested adaptation responses across geospatial and temporal scales
www.nrfirescience.org/resource/12994
The Yellowstone to Yukon Conservation Initiative (Y2Y) was established over 20 years ago as an experiment in large landscape conservation. Initially, Y2Y emerged as a response to large scale habitat fragmentation by advancing ecological connectivity. It also laid the foundation for large scale multi-stakeholder conservation...
Author(s): Gary M. Tabor, Anne Carlson, R. Travis Belote
Year Published: 2014
Type: Document
Technical Report or White Paper

Six basic smoke management practices for prescribed burning
www.nrfirescience.org/resource/12384
Smoke management has become one of the leading challenges facing prescribed fire practitioners in the Southeast and the continued use of prescribed fire in the region may depend on effective smoke and emission mitigation practices. While not a comprehensive list of smoke management strategies, the 2011 USFS-NRCS guide to Basic Smoke...
Author(s): David R. Godwin, Alan J. Long, Peter Lahm
Year Published: 2014
Type: Document
Research Brief or Fact Sheet
Fuels treatments in ponderosa pine - Visits to the Boise National Forest and Boise Basin Exp. Forest
www.nrfirescience.org/resource/12928
Terrie Jain, Research Forester with the USFS Rocky Mountain Research Station, together with foresters, and fire and wildlife managers from the Boise National Forest led a tour of fuels treatments in dry conifer forests around Idaho City, Idaho. Site visits provided a visual of high forest fuel conditions with potential to support...
Author(s): Corey L. Gucker
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Northern Rocky Mountain Experimental Forests: settings for science, management, and education alliances
www.nrfirescience.org/resource/12911
Society's view of forests and what they produce changed considerably during the latter part of the 20th century. Prior to the 1970s, society believed that forests in the western United States provided a seemingly infinite supply of natural resources and economic prosperity. The public trusted experts to make forest management...
Author(s): Theresa B. Jain, Michael A. Battaglia, Russell T. Graham
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Dry forest resilience varies under simulated climate-management scenarios in a central Oregon, USA landscape
www.nrfirescience.org/resource/14233
Determining appropriate actions to create or maintain landscapes resilient to climate change is challenging because of uncertainty associated with potential effects of climate change and their interactions with land management. We used a set of climate-informed state-and-transition models to explore the effects of management and...
Author(s): Joshua S. Halofsky, Jessica E. Halofsky, Theresa Burcsu, Miles A. Hemstrom
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Adapting to climate change
www.nrfirescience.org/resource/13430
Federal agencies have led the development of adaptation principles and tools in forest ecosystems over the past decade. Successful adaptation efforts generally require organizations to: (1) develop science-management partnerships, (2) provide education on climate change science, (3) provide a toolkit of methods and processes for...
Author(s): Constance I. Millar, Christopher W. Swanson, David L. Peterson
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Large airtanker use and outcomes in suppressing wildland fires in the United States
www.nrfirescience.org/resource/13952
Wildfire activity in the United States incurs substantial costs and losses, and presents challenges to federal, state, tribal and local agencies that have responsibility for wildfire management. Beyond the
potential socioeconomic and ecological losses, and the monetary costs to taxpayers due to suppression, wildfire management is a...

Author(s): David E. Calkin, Crystal S. Stonesifer, Matthew P. Thompson, Charles W. McHugh
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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

Learning to coexist with wildfire
www.nrfirescience.org/resource/15326
The impacts of escalating wildfire in many regions — the lives and homes lost, the expense of suppression and the damage to ecosystem services — necessitate a more sustainable coexistence with wildfire. Climate change and continued development on fire-prone landscapes will only compound current problems. Emerging strategies for...
Author(s): Max A. Moritz, E. Batllori, Ross A. Bradstock, A. Malcolm Gill, J. Handmer, Paul F. Hessburg, J. Leonard, Sarah M. McCaffrey, Dennis C. Odion, Tania L. Schoennagel, Alexandra D. Syphard
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

The Bitterroot Valley fires of 2000 - Revisiting experiences and fire effects 13 years later
www.nrfirescience.org/resource/12673
During the Fires of 2000 field trip, held as part of the May 2014 Large Wildland Fires Conference, researchers, managers, residents, and stakeholders shared their experiences around the unprecedented number and size of fires that burned in the Bitterroot Valley in the summer of 2000. Topics discussed included fire history, fire...
Author(s): Corey L. Gucker
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Forest Fire Severity Patterns of Resource Objective Wildfires in the Southern Sierra Nevada
www.nrfirescience.org/resource/23463
Distinguishing favorable versus undesirable outcomes of wildland fires in coniferous forest ecosystems is challenging and requires a clear and objective approach. I applied the natural range of variation (NRV) concept and used fire severity indicators to evaluate the possible effects of wildfires managed for resource benefits (... 
Author(s): Marc D. Meyer
Year Published: 2014
Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: a strategic multi-scale approach

This Report provides a strategic approach for conservation of sagebrush ecosystems and Greater Sage-Grouse (sage-grouse) that focuses specifically on habitat threats caused by invasive annual grasses and altered fire regimes. It uses information on factors that influence (1) sagebrush ecosystem resilience to disturbance and...

Author(s): Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Michael L. Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, Aamrinar Wuenschel
Year Published: 2014
Type: Document
Management or Planning Document

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

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

Perverse incentives: the case of wildfire smoke regulation

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

Author(s): Kirsten H. Engel
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Consequences of spatial heterogeneity for ecosystem services in changing forest landscapes: priorities for future research

Changes in key drivers (e.g., climate, disturbance regimes and land use) may affect the sustainability of forest landscapes and set the stage for increased tension among competing ecosystem services. We addressed two questions about a suite of supporting, regulating and provisioning ecosystem services in each of two well-studied...

Author(s): Monica G. Turner, Daniel C. Donato, William H. Romme
Year Published: 2013
Type: Document
Book or Chapter or Journal Article
Analyzing the transmission of wildfire exposure on a fire-prone landscape in Oregon, USA

We develop the idea of risk transmission from large wildfires and apply network analyses to understand its importance on a 0.75 million ha US national forest. Wildfires in the western US frequently burn over long distances (e.g., 20-50 km) through highly fragmented landscapes with respect to ownership, fuels, management intensity....

Author(s): Alan A. Ager, Michelle A. Day, Mark A. Finney, Ken W. Vance-Borland, Nicole M. Vaillant

Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Summary of science, activities, programs, and policies that influence the rangewide conservation of greater sage-grouse (Centrocercus urophasianus)

Because of their broad range, variations in population traits and characteristics across this range, and the variability in habitat conditions and threats within this range, conservation of sage-grouse is a unique challenge compared to isolated or range-restricted species, primarily due to the scale of the effort. This complexity is...


Year Published: 2013
Type: Document
Technical Report or White Paper

The many elements of traditional fire knowledge: synthesis, classification, and aids to cross-cultural problem solving in fire-dependent systems around the world

I examined the hypothesis that traditional social-ecological fire systems around the world include common elements of traditional fire knowledge (TFK). I defined TFK as fire-related knowledge, beliefs, and practices that have been developed and applied on specific landscapes for specific purposes by long time inhabitants. In all, 69...

Author(s): Mary R. Huffman

Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Rethinking the study of landscape management practices among hunter–gatherers in North America

There has been little movement to systematically incorporate the study of indigenous landscape management practices the method and theory of hunter-gatherer research in North American archaeology, despite a growing interest in this The purposes of this article are twofold. One is to address why, until quite recently, archaeologists...

Author(s): Kent G. Lightfoot, Rob Q. Cuthrell, Chuck J. Striplen, Mark G. Hylkema

Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Sustainability in forest management and a new role for resilience thinking
Forest management faces a substantial challenge with ever-more-pervasive anthropogenic impacts and growing demands on forests coupled with the increasing certainty of global change. If the capacity of forests to provide valued ecological goods and services in the future is to be maintained, new tools and approaches will be needed.

Author(s): Lucy Rist, Jon Moen
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Diversity and dynamism of fire science user needs
www.nrfirescience.org/resource/12636
The Joint Fire Science Program has initiated regional consortia to deliver science to managers and other natural resource stakeholders. Given the diversity and complexity of forest management and policy, there is a need to understand and reframe fire science user audiences. In this article, we assess fire science use in the US...

Author(s): Emily Jane Davis, Cassandra Moseley, Christine Olsen, Jesse Abrams, Janean Creighton
Year Published: 2013
Type: Document
Book or Chapter or Journal Article, Synthesis

A technical guide for monitoring wildlife habitat
www.nrfirescience.org/resource/12383
Information about status and trend of wildlife habitat is important for the U.S. Department of Agriculture, Forest Service to accomplish its mission and meet its legal requirements. As the steward of 193 million acres (ac) of Federal land, the Forest Service needs to evaluate the status of wildlife habitat and how it compares with...

Author(s): Mary M. Rowland, Christina D. Vojta
Year Published: 2013
Type: Document
Technical Report or White Paper

Comparing the effect of salvage logging on birds in the Mediterranean Basin and the Rocky Mountains: common patterns, different conservation implications
www.nrfirescience.org/resource/12016
Postfire salvage logging is currently a controversial issue because of the impact that the removal of snags has on ecosystem structure and function. Although it is a common practice worldwide, the absence of comparisons across regions hinders the development of broad generalizations. Here we compare bird response to postfire salvage...

Author(s): Josep Rost, Richard L. Hutto, Lluis Brotons, Pere Pons
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Highlights of satellite-based forest change recognition and tracking using the ForWarn System
www.nrfirescience.org/resource/12395
Satellite-based remote sensing can assist forest managers with their need to recognize disturbances and track recovery. Despite the long standing availability of raw imagery, the systematic delivery of spatially continuous, ready-to-use, processed products has evaded us until recently. The web-based ForWarn system moves us a step...

Author(s): Steven P. Norman, William W. Hargrove, Joseph P. Spruce, William M. Christie, Sean W. Schroeder
The science of decision making: applications for sustainable forest and grassland management in the national forest system

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

Making monitoring count: project design for active adaptive management

Ongoing environmental change requires that managers develop strategies capable of achieving multiple objectives in an uncertain future. Active adaptive management (AAM) offers a robust approach to reducing uncertainty while also considering diverse stakeholder perspectives. Important features of AAM include recognition of learning...

Author(s): Andrew J. Larson, R. Travis Belote, Matthew A. Williamson, Gregory H. Aplet

Effectiveness of post-fire Burned Area Emergency Response (BAER) road treatments: results from three wildfires

Wildland fires often cause extreme changes in the landscape that drastically influence surface runoff and soil erosion, which can impact forest resources, aquatic habitats, water supplies, public safety, and forest access infrastructure such as forest roads. Little information is available on the effectiveness of various post-fire...

Author(s): Randy B. Foltz, Peter R. Robichaud

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

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, Tyrone Martin, Matthew A. Meyers, Lindsey E. Peavey, Hui Peng, Jaime Sainz Santamaria, Kellie A. Uyeda, Sarah E. Anderson, Christina Tague
The national cohesive wildland fire management strategy: phase III western regional action plan

www.nrfirescience.org/resource/11971

The Western Regional Action Plan is part of the culmination of a three-year effort put into motion by the Federal Land Assistance, Management and Enhancement Act of 2009 (FLAME Act). Representatives of federal, state, local, and tribal governments, scientists, interested governmental and nongovernmental organizations, businesses and...

Author(s): Wildland Fire Executive Council
Year Published: 2013
Type: Document
Management or Planning Document

Gas-particle partitioning of primary organic aerosol emissions: 3. Biomass burning

www.nrfirescience.org/resource/13476

Atmospheric organic aerosol concentrations depend in part on the gas-particle partitioning of primary organic aerosol (POA) emissions. Consequently, heating and dilution were used to investigate the volatility of biomass-burning smoke particles from combustion of common North American trees/shrubs/grasses during the third Fire Lab...

Author(s): Andrew A. May, Ezra Levin, Christopher J. Hennigan, Ilona Riipinen, Taehyoung Lee, Jeffrey L. Collett, Jose L. Jimenez, Sonia M. Kreidenweis, Allen L. Robinson
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

FUEGO - Fire Urgency Estimator in Geosynchronous Orbit - A proposed early-warning fire detection system

www.nrfirescience.org/resource/12388

Current and planned wildfire detection systems are impressive but lack both sensitivity and rapid response times. A small telescope with modern detectors and significant computing capacity in geosynchronous orbit can detect small (12 m²) fires on the surface of the earth, cover most of the western United States (under conditions of...

Author(s): Carlton R. Pennypacker, Marek K. Jakubowski, Maggi Kelly, Michael Lampton, Christopher Schmidt, Scott L. Stephens, Robert Tripp
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Wildland Fire Management Decision Making

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
Roads impact the distribution of noxious weeds more than restoration treatments in a lodgepole pine forest in Montana, U.S.A.
www.nrfirescience.org/resource/8346
A century of fire suppression has created unnaturally dense stands in many western North American forests, and silviculture treatments are being increasingly used to reduce fuels to mitigate wildfire hazards and manage insect infestations. Thinning prescriptions have the potential to restore forests to a more historically...
Author(s): Jennifer L. Birdsall, Ward W. McCaughey, Justin B. Runyon
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Chapter 9: Implications of fire management on cultural resources
www.nrfirescience.org/resource/12571
Previous chapters in this synthesis have identified the important fuel, weather, and fire relationships associated with damage to cultural resources (CR). They have also identified the types of effects commonly encountered in various fire situations and provided some guidance on how to recognize damages and minimize their occurrence...
Author(s): Rebecca Timmons, Leonard F. DeBano, Kevin C. Ryan
Year Published: 2012
Type: Document
Synthesis, Technical Report or White Paper

Cheating cheatgrass: new research to combat a wily invasive weed
www.nrfirescience.org/resource/12130
Cheatgrass and its cousin, red brome, are exotic annual grasses that have invaded and altered ecosystem dynamics in more than 41 million acres of desert shrublands between the Rockies and the Cascade-Sierra chain. A fungus naturally associated with these Bromus species has been found lethal to the plants' soil-banked dormant seeds....
Author(s): Gail Wells
Year Published: 2012
Type: Document
Research Brief or Fact Sheet

Utility of remotely sensed imagery for assessing the impact of salvage logging after forest fires
www.nrfirescience.org/resource/8352
Remotely sensed imagery provides a useful tool for land managers to assess the extent and severity of post-wildfire salvage logging disturbance. This investigation uses high resolution QuickBird and National Agricultural Imagery Program (NAIP) imagery to map soil exposure after ground-based salvage operations. Three wildfires with...
Author(s): Sarah A. Lewis, Peter R. Robichaud, Andrew T. Hudak, Brian Austin, Robert J. Liebermann
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Tree spatial patterns in fire-frequent forests of western North America, including mechanisms of pattern formation and implications for designing fuel reduction and restoration treatments
www.nrfirescience.org/resource/8316
Restoring characteristic fire regimes and forest structures are central objectives of many restoration and fuel reduction projects. Within-stand spatial pattern is a fundamental attribute of forest structure and influences many ecological processes and ecosystem functions. In this review we synthesize the
Climate change, forests, fire, water, and fish: building resilient landscapes, streams, and managers
www.nrfirescience.org/resource/11270
Fire will play an important role in shaping forest and stream ecosystems as the climate changes. Historic observations show increased dryness accompanying more widespread fire and forest die-off. These events punctuate gradual changes to ecosystems and sometimes generate stepwise changes in ecosystems. Climate vulnerability...
Author(s): Charles H. Luce, Penelope Morgan, Kathleen A. Dwire, Daniel J. Isaak, Zachary A. Holden, Bruce E. Rieman
Year Published: 2012
Type: Document

A range-wide restoration strategy for whitebark pine (Pinus albicaulis)
www.nrfirescience.org/resource/12690
Whitebark pine (Pinus albicaulis), an important component of western high-elevation forests, has been declining in both the United States and Canada since the early Twentieth Century from the combined effects of mountain pine beetle (Dendroctonus ponderosae) outbreaks, fire exclusion policies, and the spread of the exotic disease...
Year Published: 2012
Type: Document

Do thinning and/or burning treatments in western USA ponderosa or Jeffrey pine-dominated forests help restore natural fire behavior?
www.nrfirescience.org/resource/8318
We carried out a systematic review and meta-analysis of the effects of forest thinning and burning treatments on restoring fire behavior attributes in western USA pine forests. Ponderosa pine (Pinus ponderosa) and Jeffrey pine (Pinus jeffreyi), with co-occurring species, are adapted to a disturbance regime of frequent surface fires...
Author(s): Peter Z. Fule, Joseph E. Crouse, John Paul Roccaforte, Elizabeth L. Kalies
Year Published: 2012
Type: Document

Adaptation: planning for climate change and its effects on federal lands
www.nrfirescience.org/resource/12449
National forest managers are charged with tackling the effects of climate change on the natural resources under their care. The Forest Service National Roadmap for Responding to Climate Change and the Climate Change Performance Scorecard require managers to make significant progress in addressing climate change by 2015. To help land...
Author(s): Marie Oliver
Understanding the effects of fire management practices on forest health: implications for weeds and vegetation structure

www.nrfirescience.org/resource/11986
Current fire policy to restore ecosystem function and resiliency and reduce buildup of hazardous fuels implies a larger future role for fire (both natural and human ignitions) (USDA Forest Service and U.S. Department of the Interior 2000). Yet some fire management (such as building fire line, spike camps, or helispots) potentially...
Author(s): Anne E. Black, Peter Landres
Year Published: 2012
Type: Document
Technical Report or White Paper

Responding to climate change in national forests: a guidebook for developing adaptation options

www.nrfirescience.org/resource/13428
This guidebook contains science-based principles, processes, and tools necessary to assist with developing adaptation options for national forest lands. The adaptation process is based on partnerships between local resource managers and scientists who work collaboratively to understand potential climate change effects, identify...
Author(s): David L. Peterson, Constance I. Millar, Linda A. Joyce, Michael J. Furniss, Jessica E. Halofsky, Ronald P. Neilson, Toni Lyn Morelli
Year Published: 2011
Type: Document
Synthesis, Technical Report or White Paper

Strategies, tools, and challenges for sustaining and restoring high elevation five-needle white pine forests in western North America

www.nrfirescience.org/resource/11899
Many ecologically important, five-needle white pine forests that historically dominated the high elevation landscapes of western North America are now being heavily impacted by mountain pine beetle (Dendroctonus spp.) outbreaks, the exotic disease white pine blister rust (WPBR), and altered high elevation fire regimes. Management...
Author(s): Robert E. Keane, Anna W. Schoettle
Year Published: 2011
Type: Document
Conference Proceedings

Can we manage for resilience? The integration of resilience thinking into natural resource management in the United States

www.nrfirescience.org/resource/12693
The concept of resilience is now frequently invoked by natural resource agencies in the US. This reflects growing trends within ecology, conservation biology, and other disciplines acknowledging that social–ecological systems require management approaches recognizing their complexity. In this paper, we examine the concept of...
Author(s): Melinda Harm Benson, Ahjond S. Garmestani
Year Published: 2011
Type: Document
Disturbance ecology of high-elevation five-needle pine ecosystems in western North America
www.nrfirescience.org/resource/11896
This paper synthesizes existing information about the disturbance ecology of high-elevation five-needle pine ecosystems, describing disturbances regimes, how they are changing or are expected to change, and the implications for ecosystem persistence. As it provides the context for ecosystem conservation/restoration programs, we...
Author(s): Elizabeth M. Campbell, Robert E. Keane, Evan R. Larson, Michael P. Murray, Anna W. Schoettle, Carmen Wong
Year Published: 2011
Type: Document
Conference Proceedings, Synthesis

Getting results: measuring post-wildfire erosion control treatment effectiveness
www.nrfirescience.org/resource/11031
In the past decade, wildfires around the world have continued to increase in size, severity, and cost. The number of people living in wildland areas has also increased, putting public safety, homes, roads, public infrastructure, water quality, and valued natural resources at risk from wildfire and secondary fire effects. Major...
Author(s): Peter R. Robichaud, Robert E. Brown, Peter M. Wohlgemuth, Joseph W. Wagenbrenner
Year Published: 2011
Type: Document
Conference Proceedings

Fire science application and integration in support of decision making
www.nrfirescience.org/resource/21040
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: 2011
Type: Document
Conference Proceedings

Using native annual plant species to suppress weedy invasive species in post-fire habitats - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11467
Increasing fire frequencies and uncharacteristic severe fires have created a need for improved restoration methods across rangelands in western North America. Traditional restoration seed mixtures of perennial mid- to late-seral plant species may not be suitable for intensely burned sites that have been returned to an early-seral...
Author(s): Mark W. Paschke, Paul J. Meiman, William H. Romme, Cynthia S. Brown
Year Published: 2011
Type: Document
Technical Report or White Paper

Working with American Indian tribes on wildland fires: protecting cultural heritage sites in northwestern California
The Federal Land Policy and Management Act (1976: Public Law 94-579) requires coordination with approved tribal management plans for the purposes of development and revisions of such plans and is inclusive of programs or projects. Federal Government consultation, such as government-to-government protocol agreements with federally...

Author(s): Frank K. Lake
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

The future of high-elevation, five-needle white pines in western North America: Proceedings of the High Five Symposium. 28-30 June 2010; Missoula, MT

High elevation five-needle pines are rapidly declining throughout North America. The six species, whitebark (Pinus albicaulis Engelm.), limber (P. flexilis James), southwestern white (P. strobiformis Engelm.), foxtail (P. balfouriana Grev....

Author(s): Robert E. Keane, Diana F. Tomback, Michael P. Murray, Cyndi M. Smith
Year Published: 2011
Type: Document
Conference Proceedings

Beyond fire behavior and fuels: learning from the past to help guide us in the future

The third IAWF Fire Behavior and Fuels Conference was held in Spokane, Washington, October 25-29, 2010, and commemorated the 100th anniversary of the 1910 fires in the Northern Rocky Mountains. The theme of the conference was appropriately titled ‘Beyond Fire Behavior and Fuels: Learning from the Past to Help Guide Us in the...

Year Published: 2011
Type: Document
Conference Proceedings

Restoration of whitebark pine forests in the northern Rocky Mountains, USA

Whitebark pine (Pinus albicaulis) has been declining across much of its range in North America because of the combined effects of mountain pine beetle epidemics, fire exclusion policies, and widespread exotic blister rust infections. Whitebark pine seed is dispersed by a bird, the Clark's nutcracker, which caches seed in open,...

Author(s): Robert E. Keane
Year Published: 2011
Type: Document
Conference Proceedings

Effects of post-fire salvage logging on cavity-nesting birds and small mammals in southeastern Montana

We investigated how post-fire salvage logging of Ponderosa Pine (Pinus ponderosa) affected populations of cavity-nesting birds and small mammals in southeastern Montana in 2004 and 2005. We examined two salvage and two control plots with three point-count stations and one small mammal trap site randomly distributed across each plot...

Author(s): William J. Kronland, Marco Restani
Year Published: 2011
Comprehensive fuels treatment practices guide for mixed conifer forests: California, central and southern Rockies, and the Southwest
www.nrfirescience.org/resource/12630
The goal of this guide is to provide a resource for managers of mixed conifer forests of the Southwestern plateaus and uplands, the Central and Southern Rocky Mountains, the Sierra Nevada, and the Transverse and Peninsular Ranges in Southern California. Mixed conifer forests have different species, structures, and spatial patterns...
Author(s): Alexander M. Evans, Rick G. Everett, Scott L. Stephens, James A. Youtz
Year Published: 2011
Type: Document
Synthesis, Technical Report or White Paper

What Is Limiting More Flexible Fire Management—Public or Agency Pressure?
www.nrfirescience.org/resource/17812
Conventional wisdom within American federal fire management agencies suggests that external influence such as community or political pressure for aggressive suppression are key factors circumscribing the ability to execute less aggressive fire management strategies. Thus, a better understanding of external constraints on fire...
Author(s): Toddi A. Steelman, Sarah M. McCaffrey
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
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

The Sagebrush Steppe Treatment Evaluation Project (SageSTEP): a test of state-and-transition theory
www.nrfirescience.org/resource/11226
The Sagebrush Steppe Treatment Evaluation Project (SageSTEP) is a comprehensive, integrated, long-term study that evaluates the ecological effects of fire and fire surrogate treatments designed to reduce fuel and to restore sagebrush (Artemisia spp.) communities of the Great Basin and surrounding areas. SageSTEP has several features...
Year Published: 2010
Type: Document
Interactive effects of historical logging and fire exclusion on ponderosa pine forest structure in the northern Rockies
www.nrfirescience.org/resource/8210
Increased forest density resulting from decades of fire exclusion is often perceived as the leading cause of historically aberrant, severe, contemporary wildfires and insect outbreaks documented in some fire-prone forests of the western United States. Based on this notion, current U.S. forest policy directs managers to reduce stand...
Author(s): Cameron Naficy, Anna Sala, Eric G. Keeling, Jon Graham, Thomas H. DeLuca
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Continued evaluation of post-fire recovery and treatment effectiveness for validation of the ERMiT erosion model (combined proposals P07-2-2-10 and P07-2-3-06) - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11227
The use and cost of post-fire emergency stabilization treatments continues to grow. To help maximize the impact of these treatments, many assessment teams use the Erosion Risk Management Tool (ERMiT) erosion model to predict postfire erosion and mitigation effects. However, despite several completed JFSP projects, the long-term...
Author(s): Peter R. Robichaud, William J. Elliot, Joseph W. Wagenbrenner, Sarah A. Lewis, Louise E. Ashmun, Peter M. Wohlgemuth, Robert E. Brown
Year Published: 2010
Type: Document
Technical Report or White Paper

Restoration treatment effects on stand structure, tree growth, and fire hazard in a ponderosa pine/Douglas-fir forest in Montana
www.nrfirescience.org/resource/8159
Crown fires that burned thousands of ha of ponderosa pine (Pinus ponderosa Dougl. ex Laws.) forests in recent years attest to the hazardous conditions extant on the western landscape. Managers have responded with broad-scale implementation of fuel reduction treatments; however, because threats to pine forests extend beyond fire, so...
Author(s): Carl E. Fiedler, Kerry L. Metlen, Erich K. Dodson
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Management guide to ecosystem restoration treatments: whitebark pine forests of the Northern Rocky Mountains, U.S.A.
www.nrfirescience.org/resource/11143
Whitebark pine is declining across much of its range in North America because of the combined effects of mountain pine beetle epidemics, fire exclusion policies, and widespread exotic blister rust infections. This management guide summarizes the extensive data collected at whitebark pine treatment sites for three periods: (1) pre-...
Author(s): Robert E. Keane, Russell A. Parsons
Year Published: 2010
Type: Document
Technical Report or White Paper
Mitigating old tree mortality in long-unburned, fire-dependent forests: a synthesis
www.nrfirescience.org/resource/12618
This report synthesizes the literature and current state of knowledge pertaining to reintroducing fire in stands where it has been excluded for long periods and the impact of these introductory fires on overstory tree injury and mortality. Only forested ecosystems in the United States that are adapted to survive frequent fire are...
Author(s): Sharon M. Hood
Year Published: 2010
Type: Document
Synthesis, Technical Report or White Paper

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

Post-fire treatment effectiveness for hillslope stabilization
www.nrfirescience.org/resource/12594
This synthesis of post-fire treatment effectiveness reviews the past decade of research, monitoring, and product development related to post-fire hillslope emergency stabilization treatments, including erosion barriers, mulching, chemical soil treatments, and combinations of these treatments. In the past ten years, erosion barrier...
Author(s): Peter R. Robichaud, Louise E. Ashmun, Bruce D. Sims
Year Published: 2010
Type: Document
Synthesis, Technical Report or White Paper

Current health issues and management strategies for white pines in the western United States and Canada
www.nrfirescience.org/resource/8233
The introduced pathogen Cronartium ribicola, cause of white pine blister rust, has spread across much of western North America and established known infestations within all but one species of white pine endemic to western Canada and the United States. Blister rust damage to severely diseased trees reduces reproduction and survival....
Author(s): John W. Schwandt, I. Blakley Lockman, John T. Kliejunas, J. A. Muir
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

Disturbance and landscape dynamics in a changing world
www.nrfirescience.org/resource/13432
Disturbance regimes are changing rapidly, and the consequences of such changes for ecosystems and
linked social-ecological systems will be profound. This paper synthesizes current understanding of disturbance with an emphasis on fundamental contributions to contemporary landscape and ecosystem ecology, then identifies future...

Author(s): Monica G. Turner
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

**Integrating fuel treatment into ecosystem management: a proposed project planning process**
www.nrfirescience.org/resource/8206
Concern over increased wildland fire threats on public lands throughout the western United States makes fuel reduction activities the primary driver of many management projects. This single-issue focus recalls a management planning process practiced frequently in recent decades - a least-harm approach where the primary objective is...

Author(s): Keith Stockmann, Kevin D. Hyde, J. Greg Jones, Dan R. Loeffler, Robin P. Silverstein
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Management or Planning Document

**Restoring whitebark pine forests of the northern Rocky Mountains, USA**
www.nrfirescience.org/resource/8394
Whitebark pine (Pinus albicaulis) has been declining across much of its range in North America because of the combined effects of mountain pine beetle (Dendroctonus ponderosae) epidemics, fire exclusion policies, and widespread exotic blister rust infections. Whitebark pine seed is dispersed by a bird, the Clark's nutcracker (...)

Author(s): Robert E. Keane, Russell A. Parsons
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

**Delaying sheep grazing after wildfire in sagebrush steppe may not affect vegetation recovery**
www.nrfirescience.org/resource/11439
Although many land managers prohibit grazing for 2 years after a fire, little research has been conducted to determine the interaction of grazing with vegetation recovery after fire. In a study conducted in sagebrush steppe rangelands after a 2000 wildfire at the United States Sheep Experiment Station in Idaho, the influence of...

Author(s): Lovina Roselle, Steven S. Seefeldt, Karen Launchbaugh
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

**Silvicultural management of white pines in western North America**
www.nrfirescience.org/resource/8235
Since the introduction prior to 1915 of white pine blister rust (Cronartium ribicola) into the forests of western North America, many populations of native white pine species have seriously declined. Because western white pine (Pinus monticola) and sugar pine (P. lambertiana) are highly valued timber species, their silviculture...
Developing computer-based participatory approaches to mapping landscape values for landscape and resource management

www.nrfirescience.org/resource/16127

The last 50 years or so have seen a steady increase in the rate of destructive wildfires across the world, partly as a result of climate change and partly as a result of encroachment of human settlement on fire-based ecosystems (Russell et al. 2004; Westerling et al. 2006). Years of active fire suppression in such areas has...

Author(s): Stephen J. Carver, Alan E. Watson, Tim Waters, Roian Matt, Kari Gunderson, Brett Davis
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

The '88 Fires: Yellowstone and Beyond IAWF Conference Proceedings

www.nrfirescience.org/resource/18464

Description not available
Author(s): Ronald E. Masters, Krista E. M. Galley, Don G. Despain
Year Published: 2009
Type: Document
Conference Proceedings

A multi-disciplinary approach to fire management strategy, suppression costs, community interaction and organizational performance

www.nrfirescience.org/resource/17806

Over the past several fire seasons, there has been increasing emphasis on strategies to achieve fire management objectives using less than full perimeter control, such as more prescribed burning and focused point and area protection. While the strategies and tactics themselves are not new, wider use by Federal agencies, particularly...

Author(s): Anne E. Black, Krista M. Gebert, Sarah M. McCaffrey, Toddi A. Steelman, Janie Canton-Thompson
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Tree squirrel habitat selection and pre-dispersal seed predation in a declining sub-alpine conifer

www.nrfirescience.org/resource/8395

Differential responses by species to modern perturbations in forest ecosystems may have undesirable impacts on plant-animal interactions. If such disruptions cause declines in a primary seed predator, the effects on the plant could be exacerbated. We examined one such interaction...

Author(s): Shawn T. McKinney, Carl E. Fiedler
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

A MODIS direct broadcast algorithm for mapping wildfire burned area in the western United States

www.nrfirescience.org/resource/8191

Improved wildland fire emission inventory methods are needed to support air quality forecasting and guide the development of air shed management strategies. Air quality forecasting requires dynamic fire
emission estimates that are generated in a timely manner to support real-time operations. In the regulatory and planning realm,...

Author(s): Shawn P. Urbanski, J. Meghan Salmon, Bryce L. Nordgren, Wei Min Hao
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Nest-site selection by cavity-nesting birds in relation to postfire salvage logging
www.nrfirescience.org/resource/8383

Large wildfire events in coniferous forests of the western United States are often followed by postfire timber harvest. The long-term impacts of postfire timber harvest on fire-associated cavity-nesting bird species are not well documented. We studied nest-site selection by cavity-nesting birds over a 10-year period (1994-2003),...

Author(s): Victoria A. Saab, Robin E. Russell, Jonathan G. Dudley
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Technical guide for monitoring selected conditions related to wilderness character
www.nrfirescience.org/resource/12437

The purpose of monitoring wilderness character is to improve wilderness stewardship by providing managers a tool to assess how selected actions and conditions related to wilderness character are changing over time. Wilderness character monitoring provides information to help answer two key questions about wilderness character and...

Author(s): Peter Landres, Steve Boutcher, Liese Dean, Troy E. Hall, Tamara Blett, Terry Carlson, Ann Mebane, Carol Hardy, Susan Rinehart, Linda Merigliano, David N. Cole, Andy Leach, Pam Wright, Deb Bumpus
Year Published: 2009
Type: Document
Technical Report or White Paper

Invasive pathogen threatens bird-pine mutualism: implications for sustaining a high-elevation ecosystem
www.nrfirescience.org/resource/8190

Human-caused disruptions to seed-dispersal mutualisms increase the extinction risk for both plant and animal species. Large-seeded plants can be particularly vulnerable due to highly specialized dispersal systems and no compensatory regeneration mechanisms. Whitebark pine (Pinus albicaulis), a keystone subalpine species, obligately...

Author(s): Shawn T. McKinney, Carl E. Fiedler, Diana F. Tomback
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Variable impacts of imazapic rate on downy brome (Bromus tectorum) and seeded species in two rangeland communities
www.nrfirescience.org/resource/8332

The herbicide imazapic is registered for use on rangelands and provides effective short-term control of certain invasive annual grasses. However, details about optimal application rates for downy brome and susceptibility of simultaneously seeded species are lacking. Thus, we investigated downy brome and seeded species responses to...

Author(s): Christo Morris, Thomas A. Monaco, Craig W. Rigby
A synthesis of postfire road treatments for BAER teams: methods, treatment effectiveness, and decisionmaking tools for rehabilitation

We synthesized post-fire road treatment information to assist BAER specialists in making road rehabilitation decisions. We developed a questionnaire; conducted 30 interviews of BAER team engineers and hydrologists; acquired and analyzed gray literature and other relevant publications; and reviewed road rehabilitation procedures and...

Author(s): Randy B. Foltz, Peter R. Robichaud, Hakjun Rhee

Synthesis of knowledge on the effects of fire and fire surrogates on wildlife in U.S. dry forests

Dry forests throughout the United States are fire-dependent ecosystems, and much attention has been given to restoring their ecological function. As such, land managers often are tasked with reintroducing fire via prescribed fire, wildland fire use, and fire-surrogate treatments such as thinning and mastication. During planning,...

Author(s): Patricia L. Kennedy, Joseph B. Fontaine

Managing for multiple resources under climate change: National Forests

This study explores potential adaptation approaches in planning and management that the United States Forest Service might adopt to help achieve its goals and objectives in the face of climate change. Availability of information, vulnerability of ecological and socio-economic systems, and uncertainties associated with climate change...

Author(s): Linda A. Joyce, Geoffrey M. Blate, Steven G. McNulty, Constance I. Millar, Susanne Moser, Ronald P. Neilson, David L. Peterson

Emergency post-fire rehabilitation treatment effects on burned area ecology and long-term restoration

The predicted continuation of strong drying and warming trends in the southwestern United States underlies the associated prediction of increased frequency, area, and severity of wildfires in the coming years. As a result, the management of wildfires and fire effects on public lands will continue to be a major land management...
Wildfire smoke: a guide for public health officials
www.nrfirescience.org/resource/12451
Smoke rolls into town, blanketing the city, turning on streetlights, creating an eerie and choking fog. Switchboards light up as people look for answers. Citizens want to know what they should do to protect themselves. School officials want to know if outdoor events should be cancelled. The news media want to know how dangerous the...
Author(s): Michael Lipsett, Barbara Materna, Susan Lyon Stone, Shannon Therriault, Robert Blaisdell, Jeff Cook
Year Published: 2008
Type: Document
Technical Report or White Paper

Measuring effectiveness of three postfire hillslope erosion barrier treatments, western Montana, USA
www.nrfirescience.org/resource/8389
After the Valley Complex Fire burned 86 000 ha in western Montana in 2000, two studies were conducted to determine the effectiveness of contour-felled log, straw wattle, and hand-dug contour trench erosion barriers in mitigating postfire runoff and erosion. Sixteen plots were located across a steep, severely burned slope, with a...
Author(s): Peter R. Robichaud, Frederick B. Pierson, Robert E. Brown, Joseph W. Wagenbrenner
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Evaluating the effectiveness of contour-felled log erosion barriers as a post-fire runoff and erosion mitigation treatment in the western United States
www.nrfirescience.org/resource/8167
Between 1998 and 2002, six sites were established immediately after large wildfires in the western United States to determine the effectiveness of contour-felled log erosion barriers in mitigating post-wildfire runoff and erosion. In each pair of matched, burned, and small watersheds (1-13 ha), one was treated with contour-felled...
Author(s): Peter R. Robichaud, Joseph W. Wagenbrenner, Robert E. Brown, Peter M. Wohlgemuth, Jan L. Beyers
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Wildland fire in ecosystems: fire and nonnative invasive plants
www.nrfirescience.org/resource/12531
This state-of-knowledge review of information on relationships between wildland fire and nonnative invasive plants can assist fire managers and other land managers concerned with prevention, detection, and eradication or control of nonnative invasive plants. The 16 chapters in this volume synthesize ecological and botanical...
Year Published: 2008
Type: Document
Synthesis, Technical Report or White Paper

Cross-scale drivers of natural disturbances prone to anthropogenic amplification: the dynamics of bark beetle eruptions
www.nrfirescience.org/resource/16887
Biome-scale disturbances by eruptive herbivores provide valuable insights into species interactions, ecosystem function, and impacts of global change. We present a conceptual framework using one system as a model, emphasizing interactions across levels of biological hierarchy and spatiotemporal scales. Bark beetles are major natural...

Author(s): Kenneth F. Raffa, Brian H. Aukema, Barbara J. Bentz, Allan L. Carroll, Jeffrey A. Hicke, Monica G. Turner, William H. Romme
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Living artifacts: the ancient ponderosa pines of the West

www.nrfirescience.org/resource/8160
Until late in the nineteenth century, magnificent ponderosa pine forests blanketed much of the inland West. They covered perhaps 30 million acres, an area the size of New York state, spreading across the mountains of New Mexico, Arizona, and California and flourishing throughout the eastern Cascades, the intermountain Pacific...

Author(s): Stephen F. Arno, Lars Ostlund, Robert E. Keane
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Landscape-level changes

www.nrfirescience.org/resource/11480
Since European settlement, Utah's vegetative landscapes have changed. Like other arid states, these wildland systems were depleted and altered. Certain steps were taken through private, community, and finally public efforts, such as establishment of Forest Reserves (National Forests), to stop the slide. Conservation and management...

Author(s): Joel A. Frandsen
Year Published: 2008
Type: Document
Conference Proceedings

Simulation of the consequences of different fire regimes to support wildland fire use decisions

www.nrfirescience.org/resource/11429
The strategy known as wildland fire use, in which lightning-ignited fires are allowed to burn, is rapidly gaining momentum in the fire management community. Managers need to know the consequences of an increase in area burned that might result from an increase in wildland fire use. One concern of land managers as they consider...

Author(s): Carol Miller
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Treatment of data influenced by exceptional events; final rule

www.nrfirescience.org/resource/12454
This action finalizes a rule to govern the review and handling of air quality monitoring data influenced by exceptional events. Exceptional events are events for which the normal planning and regulatory process established by the Clean Air Act (CAA) is not appropriate. In this rulemaking action, EPA is finalizing the proposal to:....

Author(s): U.S. Environmental Protection Agency
Year Published: 2007
Science information for informing forest fuel management in dry forests of the western United States
www.nrfirescience.org/resource/7929
Land managers need timely and straightforward access to the best scientific information available for informing decisions on how to treat forest fuels in the dry forests of the western United States. However, although there is a tremendous amount of information available for informing fuels management decisions, often, it is in a...
Author(s): Sarah M. McCaffrey, Russell T. Graham
Year Published: 2007
Type: Document
Book or Chapter or Journal Article, Synthesis

Fire, fuels and restoration of ponderosa pine-Douglas fir forests in the Rocky Mountains, USA
www.nrfirescience.org/resource/8223
Forest restoration in ponderosa pine and mixed ponderosa pine-Douglas fir forests in the US Rocky Mountains has been highly influenced by a historical model of frequent, low-severity surface fires developed for the ponderosa pine forests of the Southwestern USA. A restoration model, based on this low-severity fire model, focuses on...
Author(s): William L. Baker, Thomas T. Veblen, Rosemary L. Sherriff
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Nest densities of cavity-nesting birds in relation to postfire salvage logging and time since wildfire
www.nrfirescience.org/resource/8145
We monitored the nest densities and nest survival of seven cavity-nesting bird species, including four open-space foragers (American Kestrel [Falco sparverius], Lewis's Woodpecker [Melanerpes lewis], Western Bluebird [Sialia mexicana], and Mountain Bluebird [S. currucoides]) and three wood-foragers (Hairy Woodpecker [Picoides...)
Author(s): Victoria A. Saab, Robin E. Russell, Jonathan G. Dudley
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Photographic handbook for comparing burned and unburned sites within a dry forested and grassland mosaic: a tool for communication, calibration, and monitoring post-fire effects
www.nrfirescience.org/resource/11237
This photograph handbook describes characteristics and burn severity of a dry forested and grassland mosaic that burned within the last decade. We show photographs of different burned and unburned sites to help compare fire occurrence in similar stands. The handbook provides local land managers with a quick, inexpensive, and...
Author(s): Theresa B. Jain, Molly Juillerat, Jonathan Sandquist, Mike Ford, Brad Sauer, Robert J. Mitchell, Scott McAvoy, Justin Hanley, Jon David
Year Published: 2007
Type: Document
Technical Report or White Paper
Factors in United States Forest Service district rangers’ decision to manage a fire for resource benefit

www.nrfirescience.org/resource/21723

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

The influence of white pine blister rust on seed dispersal in whitebark pine

www.nrfirescience.org/resource/8391

We tested the hypotheses that white pine blister rust (Cronartium ribicola J.C. Fisch.) damage in whitebark pine (Pinus albicaulis Engelm.) stands leads to reduced (1) seed cone density, (2) predispersal seed survival, and (3) likelihood of Clark's Nutcracker (Nucifraga columbiana (Wilson, 1811)) seed dispersal. We gathered data...

Author(s): Shawn T. McKinney, Diana F. Tomback
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Guide to fuel treatments in dry forests of the Western United States: assessing forest structure and fire hazard

www.nrfirescience.org/resource/11166

Guide to Fuel Treatments analyzes a range of fuel treatments for representative dry forest stands in the Western United States with overstories dominated by ponderosa pine (Pinus ponderosa), Douglas-fir (Pseudotsuga menziesii), and pinyon pine (Pinus edulis). Six silvicultural options (no thinning; thinning from below to 50 trees...)

Author(s): Morris C. Johnson, David L. Peterson, Crystal L. Raymond
Year Published: 2007
Type: Document
Technical Report or White Paper

Managing forest structure and fire hazard - A tool for planners

www.nrfirescience.org/resource/8404

Fire planners and other resource managers need to examine a range of potential fuel and vegetation treatments to select options that will lead to desired outcomes for fire hazard and natural resource conditions. A new approach to this issue integrates concepts and tools from silviculture and fuel science to quantify outcomes for a...

Author(s): Morris C. Johnson, David L. Peterson, Crystal L. Raymond
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Floods, fire, and ice: disturbance ecology of riparian cottonwoods

www.nrfirescience.org/resource/8237

Cottonwoods are poplar trees that are well adapted to dynamic riparian, or streamside, zones throughout the Northern Hemisphere. Here we assess the influences of three prominent physical
disturbances, floods, fire, and ice, on cottonwood population ecology. We emphasize cottonwoods along rivers from the 'Crown of the Continent', the...
Author(s): Stewart B. Rood, Lori A. Goater, John M. Mahoney, Cheryl M. Pearce, Derald G. Smith
Year Published: 2007
Type: Document
Book or Chapter or Journal Article, Synthesis

Wildfire, timber salvage, and the economics of expediency
www.nrfirescience.org/resource/8124
Administrative planning rules and legal challenges can have significant economic impacts on timber salvage programs on public lands. This paper examines the costs of the delay in salvage caused by planning rules and the costs associated with the volume reductions forced by legal challenges in one case study. The fires on the...
Author(s): Jeffrey P. Prestemon, David N. Wear, Fred J. Stewart, Thomas P. Holmes
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Development of initial Wildland Fire Use documentation for Charles M. Russell National Wildlife Refuge
www.nrfirescience.org/resource/11077
The Charles M. Russell National Wildlife Refuge manages ecosystems that depend on fire for their maintenance. Fire is abundant in and adjacent to the refuge where lightning and human ignitions can rapidly spread in grass and shrub fuels. Farm and ranch land which would be adversely impacted by fire, pose a significant logistical...
Author(s): Bill Clark, Doug Stephen, Pat Stephen, Laurie L. Kurth, Ken Kerr
Year Published: 2006
Type: Document
Management or Planning Document

The roles of natural and human disturbances in forest soil erosion
www.nrfirescience.org/resource/8170
Forests provide numerous benefits for society, including fibre, wildlife and recreation. Forest managers are challenged to balance ecosystem health with maintaining public forest lands for multiple uses. During the first half of the last century, public forest management emphasized the harvesting of forest resources. In recent years...
Author(s): William J. Elliot
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Fire and restoration of sagebrush ecosystems
www.nrfirescience.org/resource/15377
Wildlife managers often resort to prescribed fire to restore sagebrush (Artemisia spp.) ecosystems thought to have been affected by fire exclusion. However, a fire mosaic of burned and unburned areas may be tolerated by certain wildlife but can be detrimental to sagebrush obligates. This article assesses evidence about the...
Author(s): William L. Baker
Year Published: 2006
Type: Document
Book or Chapter or Journal Article
Snag longevity in relation to wildfire and postfire salvage logging
www.nrfirescience.org/resource/8142
Snags create nesting, foraging, and roosting habitat for a variety of wildlife species. Removal of snags through postfire salvage logging reduces the densities and size classes of snags remaining after wildfire. We determined important variables associated with annual persistence rates (the probability a snag remains standing from 1...
Author(s): Robin E. Russell, Victoria A. Saab, Jonathan G. Dudley, Jay J. Rotella
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Short- and longer-term effects of fire and herbivory on sagebrush communities in south-central Montana
www.nrfirescience.org/resource/15440
To better understand the role of herbivory and fire as potential disturbance processes in sagebrush communities, we examined responses of a grazing ungulate, elk (Cervus elaphus), following prescribed burning of sagebrush (Artemisia tridentata ssp. vaseyana) in south-central Montana (USA.) with concurrent monitoring of changes in...
Author(s): Fred Van Dyke, Jeffrey A. Darragh
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Postfire logging in riparian ecosystems
www.nrfirescience.org/resource/8126
We reviewed the behavior of wildfire in riparian zones, primarily in the western United States, and the potential ecological consequences of postfire logging. Fire behavior in riparian zones is complex, but many aquatic and riparian organisms exhibit a suite of adaptations that allow relatively rapid recovery after fire. Unless...
Author(s): Gordon H. Reeves, Peter A. Bisson, Bruce E. Rieman, Lee E. Benda
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Overcoming barriers to the use of science in national parks (session summary)
www.nrfirescience.org/resource/12564
Following passage of the 1998 National Parks Omnibus Management Act (also known as the Thomas Bill), the National Park Service (NPS) secured funding through the Natural Resource Challenge (NRC) to promote scientifically sound management of parks, increase the scientific community’s involvement in providing needed information, and...
Author(s): Vita Wright
Year Published: 2006
Type: Document
Conference Proceedings

Ecological science relevant to management policies for fire-prone forests of the western United States, Society for Conservation Biology scientific panel of fire in western U.S. forests
www.nrfirescience.org/resource/11190
Fire is a primary natural disturbance in most forests of western North America and has shaped their
plant and animal communities for millions of years. Native species and fundamental ecological processes are dependent on conditions created by fire. However, many western forests have experienced shifts in wildfire regimes and forest...

Author(s): Reed F. Noss, Jerry F. Franklin, William L. Baker, Tania L. Schoennagel, Peter B. Moyle
Year Published: 2006
Type: Document
Technical Report or White Paper

Wilderness fire management in a changing world
www.nrfirescience.org/resource/7963
Several strategies are available for reducing accumulated forest fuels and their associated risks, including naturally or accidentally ignited wildland fires, management ignited prescribed fires, and a variety of mechanical and chemical methods (Omi 1996). However, a combination of policy, law, philosophy, and logistics suggest...
Author(s): Carol Miller
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

The complexity of managing fire-dependent ecosystems in wilderness: relict ponderosa pine in the Bob Marshall Wilderness
www.nrfirescience.org/resource/7953
Isolated wilderness ecosystems with a history of frequent, low-severity fires have been altered due to many decades of fire exclusion and, as a result, are difficult to restore for philosophical and logistical reasons. In this paper, we describe the successional conditions of ponderosa pine (Pinus ponderosa) communities along the...
Author(s): Robert E. Keane, Stephen F. Arno, Laura J. Dickinson
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Ponderosa pine ecosystems
www.nrfirescience.org/resource/11142
Ponderosa pine is one of the most widely distributed tree species in western North America. It is highly-valued as a source of lumber, but also is key to the health and social value western forests, whether growing in pure stands or in mixture with other conifer and hardwood species. In recent years, management objectives for...
Author(s): Russell T. Graham, Theresa B. Jain
Year Published: 2006
Type: Document
Synthesis, Technical Report or White Paper

Monitoring changes in soil quality from post-fire logging in the inland northwest
www.nrfirescience.org/resource/11015
The wildland fires of 2000, 2002, and 2003 created many opportunities to conduct post-fire logging operations in the Inland Northwest. Relatively little information is available on the impact of post-fire logging on long-term soil productivity or on the best method for monitoring these changes. We present a USDA Forest Service...
Author(s): Deborah S. Page-Dumroese, Martin F. Jurgensen, Ann Abbott, Thomas M. Rice, Joanne M. Tirocke, Sue Farley, Sharon DeHart
Year Published: 2006
Vegetation response to restoration treatments in ponderosa pine-Douglas-fir forests
www.nrfirescience.org/resource/11503
The study site is located at the University of Montana's Lubrecht Experimental Forest, Missoula County, Montana, USA. This study is 1 of 13 in a nationwide network of Fire/Fire Surrogate (FFS) studies investigating the interdisciplinary effects of treatments designed to reduce fire hazard and restore the structure and function of...
Author(s): Kerry L. Metlen, Erich K. Dodson, Carl E. Fiedler
Year Published: 2006
Type: Document

Using focus groups to involve citizens in resource management - investigating perceptions of smoke as a barrier to prescribed forest burning
www.nrfirescience.org/resource/11214
Participants in a series of focus groups discussed how their tolerance for smoke varied by the source of the smoke and found their opinions changing as they talked with other participants. Even those opposed to smoke from agricultural burning eventually found smoke from prescribed forest burning would be acceptable under appropriate...
Author(s): Brad R. Weisshaupt, Matthew S. Carroll, Keith A. Blatner, Pamela J. Jakes
Year Published: 2006
Type: Document

Whitebark pine guidelines for planting prescriptions
www.nrfirescience.org/resource/11005
This paper reviews general literature, research studies, field observations, and standard Forest Service survival surveys of high-elevation whitebark pine plantations and presents a set of guidelines for outplanting prescriptions. When planting whitebark pine, the recommendations are: 1) reduce overstory competition; 2) reduce...
Author(s): Joe H. Scott, Ward W. McCaughey
Year Published: 2006
Type: Document

Fire ecology of ponderosa pine and the rebuilding of fire-resilient ponderosa pine ecosystems
www.nrfirescience.org/resource/11074
The ponderosa pine ecosystems of the West have change dramatically since Euro-American settlement 140 years ago due to past land uses and the curtailment of natural fire. Today, ponderosa pine forests contain overabundance of fuel, and stand densities have increased from a range of 49-124 trees ha-1 (20-50 trees acre-1) to a range...
Author(s): Stephen A. Fitzgerald
Year Published: 2005
Type: Document

Land-base changes in the United States: long-term assessments of forest land condition
www.nrfirescience.org/resource/126
Forest land conditions affect the potential of U.S. forests to sustain a wide array of forest goods and environmental services (e.g., biodiversity) that society demands. Forest survey data collected by U.S. Department of Agriculture Forest Service Forest Inventory and Analysis (FIA) units are being used in long-term assessments of U...

Author(s): Ralph J. Alig
Year Published: 2005
Type: Document
Technical Report or White Paper

New technology for fuel breaks and green strips in urban interface and wildland areas
www.nrfirescience.org/resource/11039
Threat from wildfire can be greatly minimized through proactive efforts that reduce and slow spread through use of green strips or fuel breaks, and decrease fire volatility by reducing fuel load. This results in greater safety to fire fighters and protection to key urban interface areas or wildlife habitat. The fight against western...

Author(s): Jennifer L. Vollmer
Year Published: 2005
Type: Document
Conference Proceedings

Forest structure and fire hazard in dry forests of the Western United States
www.nrfirescience.org/resource/11163
ANNOTATION: This document synthesizes the relevant scientific knowledge that can assist fuel-treatment projects on national forests and other public lands and contribute to National Environmental Policy Act (NEPA) analyses and other assessments. It is intended to support science-based decision making for fuel management in dry...

Author(s): David L. Peterson, Morris C. Johnson, James K. Agee, Theresa B. Jain, Donald McKenzie, Elizabeth D. Reinhardt
Year Published: 2005
Type: Document
Synthesis, Technical Report or White Paper

Reseeding big sagebrush: techniques and issues
www.nrfirescience.org/resource/11006
Reestablishing big sagebrush on rangelands now dominated by native perennial grasses, introduced perennial grasses, or exotic annual grasses, particularly cheatgrass (Bromus tectorum), serves to stabilize soil, improve moisture availability and nutrient recycling, increase biological diversity, and foster community stability and...

Author(s): Nancy L. Shaw, Ann M. DeBolt, Roger Rosentreter
Year Published: 2005
Type: Document
Conference Proceedings

Dry forests and wildland fires of the inland Northwest USA: contrasting the landscape ecology of the pre-settlement and modern eras
www.nrfirescience.org/resource/7941
Prior to Euro-American settlement, dry ponderosa pine and mixed conifer forests (hereafter, the 'dry forests') of the Inland Northwest were burned by frequent low- or mixed-severity fires. These mostly surface fires maintained low and variable tree densities, light and patchy ground fuels, simplified forest structure, and favored...

Author(s): Paul F. Hessburg, James K. Agee, Jerry F. Franklin
**When to prescribe**

www.nrfirescience.org/resource/11500

Prescribed fire can be the most practical and affordable way to reduce dangerous accumulations of combustible fuels. At the same time, prescribed fire can help restore the ecological process of fire to fire-adapted ecosystems through its influence on soil nutrients, growth and mortality of plants, seedling establishment and...

Author(s): Carol Miller

Year Published: 2005

Type: Document

**Plant succession and approaches to community restoration**

www.nrfirescience.org/resource/8418

The processes of vegetation change over time, or plant succession, are also the processes involved in plant community restoration. Restoration efforts attempt to use designed disturbance, seedbed preparation and sowing methods, and selection of adapted and compatible native plant materials to enhance ecological function. The large...

Author(s): Bruce A. Roundy

Year Published: 2005

Type: Document

**Assessing the causes, consequences and spatial variability of burn severity: a rapid response proposal - Final Report to the Joint Fire Science Program**

www.nrfirescience.org/resource/11149

In this rapid response project, we have collected data on post-fire effects and pre-fire fuels and vegetation from 10 large fires that burned in 2003 and 2004. We use field and remotely sensed data collected during and soon after wildfires to quantify the interactions and spatial variability in fire effects, fuels, fire behavior,...

Author(s): Penelope Morgan, Andrew T. Hudak, Peter R. Robichaud, Kevin C. Ryan

Year Published: 2005

Type: Document

**Simple algorithm to determine the near-edge smoke boundaries with scanning lidar**

www.nrfirescience.org/resource/7957

We propose a modified algorithm for the gradient method to determine the near-edge smoke plume boundaries using backscatter signals of a scanning lidar. The running derivative of the ratio of the signal standard deviation (STD) to the accumulated sum of the STD is calculated, and the location of the global maximum of this function is...

Author(s): Vladimir A. Kovalev, Cyle E. Wold, Jenny O. Newton, Wei Min Hao

Year Published: 2005

Type: Document

**Landscape restoration for greater sage-grouse: implications for multiscale planning and**
Habitats and populations of greater sage-grouse (Centrocercus urophasianus) have declined throughout western North America in response to a myriad of detrimental land uses. Successful restoration of this species' habitat, therefore, is of keen interest to Federal land agencies who oversee management of most remaining habitat. To...

Author(s): Michael J. Wisdom, Mary M. Rowland, Miles A. Hemstrom, Barbara C. Wales
Year Published: 2005
Type: Document
Conference Proceedings, Synthesis

The complex topography of the inland northwestern U.S. (58.4 million ha) interacts with continental and maritime air masses to create a highly variable climate, which results in a variety of forest settings. Historically (1850 to 1900), approximately 20% of the area was covered by dry forests (Pinus ponderosa, Pseudotsuga menziesii...)

Author(s): Theresa B. Jain, Russell T. Graham
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

The sagebrush (Artemisia spp.) ecosystem once occupied over 150 million acres of western North America (Barbour and Billings 1988). The ecosystem still occupies over 100 million acres (Connelly et al. 2004, Wisdom et al. 2005), but the abundance and condition of sagebrush communities is declining rapidly in response to a variety of...

Author(s): Michael J. Wisdom, Mary M. Rowland, Robin J. Tausch
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

No description entered.

Author(s): Merrill R. Kaufmann, Kevin C. Ryan, Peter Z. Fule, William H. Romme
Year Published: 2005
Type: Document
Book or Chapter or Journal Article
Predicting risks of uncharacteristic wildfires: application of the risk assessment process
www.nrfirescience.org/resource/12714
The National Environmental Policy Act (NEPA) mandates that the U.S. Forest Service (USFS) conduct an Environmental Impact Assessment (EIA) as its fire management policy evolves to cope with a legacy of over 100 years of fire suppression on national forest lands and an increasing occurrence of uncharacteristically large, intense...
Author(s): Anne Fairbrother, Jessica G. Turnley
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Sage-grouse habitat restoration symposium proceedings
www.nrfirescience.org/resource/11007
Declines in habitat of greater sage-grouse and Gunnison sage-grouse across the western United States are related to degradation, loss, and fragmentation of sagebrush ecosystems resulting from development of agricultural lands, grazing practices, changes in wildfire regimes, increased spread of invasive species, gas and oil...
Author(s): Nancy L. Shaw, Michael L. Pellant, Stephen B. Monsen
Year Published: 2005
Type: Document
Conference Proceedings

Restoring Wyoming big sagebrush
www.nrfirescience.org/resource/8420
The widespread occurrence of big sagebrush can be attributed to many adaptive features. Big sagebrush plays an essential role in its communities by providing wildlife habitat, modifying local environmental conditions, and facilitating the reestablishment of native herbs. Currently, however, many sagebrush steppe communities are...
Author(s): Cindy R. Lysne
Year Published: 2005
Type: Document
Conference Proceedings, Synthesis

Physiological response of ponderosa pine in western Montana to thinning, prescribed fire, and burning season
www.nrfirescience.org/resource/8147
Low-elevation ponderosa pine (Pinus ponderosa Dougl. ex. Laws.) forests of the northern Rocky Mountains historically experienced frequent low-intensity fires that maintained open uneven-aged stands. A century of fire exclusion has contributed to denser ponderosa pine forests with greater competition for resources, higher tree stress....
Author(s): Anna Sala, Gregory D. Peters, Lorna R. McIntyre, Michael G. Harrington
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Strategies to enhance plant structure and diversity in crested wheatgrass seedings
www.nrfirescience.org/resource/8417
Crested wheatgrass (Agropyron cristatum sensu amplo [L.] Gaertn.) is an introduced, caespitose grass that has been seeded on millions of acres of Western rangelands. In some areas, crested wheatgrass seedings overlap with critical sage-grouse (Centrocercus urophasianus; C. minimus) habitat, raising the question of how plant...
Automated forecasting of smoke dispersion and air quality using NASA terra and aqua satellite data (Task 5) - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11150
This document contains a description of the air quality forecasting system in operation at the Missoula Fire Science Laboratory. This air quality forecasting system has been steadily assimilating new techniques and algorithms as they have been developed over the past four years. Individual components as well as assemblies of...

Enhancing moist forest restoration opportunities in riparian systems
www.nrfirescience.org/resource/10976
In northern Rocky Mountain moist forests, riparian systems contain many attributes that create unique biophysical conditions that alter disturbances and microenvironments; thus creating distinct forest structures, species composition, and management challenges. For example, browsing, limited opening size, competition from...

Monitoring changes in weed populations: post-fire and post-herbicide treatment
www.nrfirescience.org/resource/11040
Description not entered

Lewis's Woodpecker (Melanerpes lewis): a technical conservation assessment
www.nrfirescience.org/resource/11498
Lewis's woodpecker (Melanerpes lewis) is a locally common but patchily distributed woodpecker species usually seen in open forests of western North America. The combination of its sporadic distribution, its diet of adult-stage free-living insects (primarily aerial), its preference to nest in burned landscapes, and its variable...

Forbs for seeding range and wildlife habitats
www.nrfirescience.org/resource/11120
Description not entered
**Fuels planning: science synthesis and integration; environmental consequences fact sheet 7: fire and weeds**

Weed infestations cause an economic loss of $13 billion per year even though $9.5 billion per year is spent on weed control measures. In addition to these economic costs, weeds are replacing native species, altering native plant and animal communities, affecting ecosystem health and function, threatening biodiversity and Threatened...

**Guidelines for restoration and rehabilitation of principal plant communities**

Range and wildland improvement projects conducted throughout the Intermountain region normally occur within specific plant communities. Each plant community has unique features that require different equipment, planting techniques, and plant materials to conduct improvement projects. Plant communities or associations discussed in...

**Human and nature interactions: a dynamic land base of many goods and services**

Availability of land is fundamental for sustainable forestry, providing the basis for the production of a wide array of goods and services (for example, biodiversity, forest carbon sequestration). This paper summarizes types of land-related data contained in major U.S. data bases, and gives examples of how such data were used in...

**Establishment of aerially seeded big sagebrush following southern Idaho wildfires**

In the western United States, big sagebrush (Artemisia tridentata) steppe communities dominate approximately 60 million ha (148 million acres) and comprise the largest vegetation type (Wambolt and Hoffman 2001). However, due to the invasion of exotic plants, fire has become a driving force in the ecology and management of sagebrush...
Restoring vigor and reducing hazard in an old growth western larch stand (Montana)
www.nrfirescience.org/resource/7926
Description not entered
Author(s): Carl E. Fiedler, Michael G. Harrington
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Basic considerations for range and wildlife revegetation and restoration
www.nrfirescience.org/resource/11118
Plummer and others (1968) proposed 10 principles to follow when planning and implementing rangeland revegetation programs. These principles - or basic considerations for rangeland managers - are applicable to most sites in the Western United States (Jordan 1981; Merkel and Herbal 1973), and many projects in the Intermountain area...
Author(s): Richard Stevens
Year Published: 2004
Type: Document
Technical Report or White Paper

Acceptability norms toward fire management in three national forests
www.nrfirescience.org/resource/21726
Norm theory offers a paradigm for understanding why the public judges management actions acceptable or unacceptable. This study assesses normative beliefs about acceptable wildland fire management. The acceptability of three fire management actions for eight scenarios was examined. The scenarios varied by fire origin and fire impact...
Author(s): Katie Kneeshaw, Jerry J. Vaske, Alan D. Bright, James D. Absher
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Introduction to the effects of wildland fire on aquatic ecosystems in the western USA
www.nrfirescience.org/resource/8130
Description not entered
Author(s): Bruce E. Rieman, Robert E. Gresswell, Michael K. Young, Charles H. Luce
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Responses of stream benthic macroinvertebrates to fire
www.nrfirescience.org/resource/7964
Synthesis of published research on the responses of stream benthic macroinvertebrates to fire in western United States indicates a consistent pattern of response that can guide resource management and future research. Direct effects of fire generally are minor or indiscernible. Indirect effects, resulting primarily from increased...
Author(s): G. Wayne Minshall
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Comparing potential fuel treatment trade-off models: initial results
Understanding the trade-offs between short-term and long-term consequences of fire impacts on ecosystems is needed before a comprehensive fuels management program can be implemented nationally. We are evaluating 3 potential trade-off models at 8 locations in major U.S. fuel types, We present results of the initial testing of the 3...

Author(s): David R. Weise, Richard A. Kimberlin, Michael J. Arbaugh, Jimmie D. Chew, J. Greg Jones, James Merzenich, Marc R. Wiitala, Robert E. Keane, Mark D. Schaaf, Jan W. van Wagendonk
Year Published: 2003
Type: Document
Conference Proceedings

Prescribed fire effects on dalmation toadflax
Prescribed fires are important for rangeland restoration and affect plant community composition and species interactions. Many rangeland plant communities have been, or are under the threat of noxious weed invasion, however there is little information on how fire effects weeds. Our objective was to determine the effects of...

Author(s): James S. Jacobs, Roger L. Sheley
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Situational influences of acceptable wildland fire management actions
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

An environmental narrative of Inland Northwest United States forests, 1800-2000
Fire was arguably the most important forest and rangeland disturbance process in the Inland Northwest United States for millennia. Prior to the Lewis and Clark expedition, fire regimes ranged from high severity with return intervals of one to five centuries, to low severity with fire-free periods lasting three decades or less. 

Author(s): Paul F. Hessburg, James K. Agee
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Quick response small catchment monitoring techniques for comparing postfire rehabilitation treatment effectiveness
Increased runoff and erosion commonly occur after wildfires with the onset of precipitation events. Various erosion mitigation treatments are often used after wildfires to reduce flooding and sedimentation. The effectiveness of these treatments has not been well documented in the literature; therefore we undertook a rapid response...
On the impact of fire suppression and BAER restoration on weeds

In 2000, wildfires burned more than 200,000 acres on the Bitterroot National Forest of Montana and nearly 1.5 million acres in the Northern and Intermountain Regions. Management activities associated with fire suppression and post-fire restoration have had the unintentional consequence of promoting invasive weeds. As part of fire...

Key issues in fire regime research for fuels management and ecological restoration

The premise behind many projects aimed at wildfire hazard reduction and ecological restoration in forests of the western United States is the idea that unnatural fuel buildup has resulted from suppression of formerly frequent fires. This premise and its implications need to be critically evaluated by conducting area-specific...

Combining simulation and optimization for evaluating the effectiveness of fuel treatments for four different fuel conditions at landscape scales

The effectiveness of applying landscape level fuel treatments is analysed for four different landscape conditions by using both simulation and optimization. The four landscape conditions in the Bitterroot National Forest, Montana, represent a gradient of fuel conditions ranging from light, scattered, to heavy concentrated fuels....

Vegetation dynamics under fire exclusion and logging in a Rocky Mountain watershed, 1856-1996

How have changes in land management practices affected vegetation patterns in the greater Yellowstone ecosystem? This question led us to develop a deterministic, successional, vegetation model to 'turn back the clock' on a study area and assess how patterns in vegetation cover type and structure have changed through different...
Countering misinformation concerning big sagebrush

This paper examines the scientific merits of eight axioms of range or vegetative management pertaining to big sagebrush. These axioms are: (1) Wyoming big sagebrush (Artemisia tridentata ssp. wyomingensis) does not naturally exceed 10 percent canopy cover and mountain big sagebrush (A. t. ssp. vaseyana) does not naturally exceed 20...

Author(s): Bruce L. Welch, Craig Criddle
Year Published: 2003
Type: Document
Technical Report or White Paper

Status of native fishes in the western United States and issues for fire and fuels management

Conservation of native fishes and changing patterns in wildfire and fuels are defining challenges for managers of forested landscapes in the western United States. Many species and populations of native fishes have declined in recorded history and some now occur as isolated remnants of what once were larger more complex systems....

Author(s): Bruce E. Rieman, Danny C. Lee, Denver P. Burns, Robert E. Gresswell, Michael K. Young, Rick Stowell, John N. Rinne, Phil Howell
Year Published: 2003
Type: Document
Book or Chapter or Journal Article, Synthesis

Comparing two methods of identifying ecological restoration opportunities

Two methods for identifying ecological restoration opportunities in the Northern Region of the Forest Service are compared. Different analysis methods are often used to address issues at different planning scales. The first method is a nonspatial characterization of current vegetation conditions using Forest Inventory and Analysis (...)

Author(s): Jimmie D. Chew
Year Published: 2003
Type: Document
Conference Proceedings

Fire and aquatic ecosystems of the western USA: current knowledge and key questions

Understanding of the effects of wildland fire and fire management on aquatic and riparian ecosystems is an evolving field, with many questions still to be resolved. Limitations of current knowledge, and the certainty that fire management will continue, underscore the need to summarize available information. Integrating fire and...

Author(s): Peter A. Bisson, Bruce E. Rieman, Charles H. Luce, Paul F. Hessburg, Danny C. Lee, Jeffrey L. Kershner, Gordon H. Reeves, Robert E. Gresswell
Year Published: 2003
Type: Document
Book or Chapter or Journal Article, Synthesis

Selection of fire-created snags at two spatial scales by cavity-nesting birds

We examined the use of snag stands by seven species of cavity-nesting birds from 1994-1998. Selection of snags was studied in logged and unlogged burned forests at two spatial scales:
microhabitat (local vegetation characteristics) and landscape (composition and patterning of surrounding vegetation types). We modeled nest occurrence...

Author(s): Victoria A. Saab, Ree Brannon, Jonathan G. Dudley, Larry Donohoo, Dave Vanderzanden, Vicky Johnson, Henry Lachowski
Year Published: 2002
Type: Document
Technical Report or White Paper

**Wildland fire in ecosystems: effects of fire on air**
[www.nrfirescience.org/resource/12587](http://www.nrfirescience.org/resource/12587)
This state-of-knowledge review about the effects of fire on air quality can assist land, fire, and air resource managers with fire and smoke planning, and their efforts to explain to others the science behind fire-related program policies and practices to improve air quality. Chapter topics include air quality regulations and fire;...
Author(s): David V. Sandberg, Roger D. Ottmar, Janice L. Peterson, John Core
Year Published: 2002
Type: Document
Technical Report or White Paper

**Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests**
[www.nrfirescience.org/resource/8121](http://www.nrfirescience.org/resource/8121)
Fire exclusion policies have affected stand structure and wildfire hazard in north American ponderosa pine forests. Wildfires are becoming more severe in stands where trees are densely stocked with shade-tolerant understory trees. Although forest managers have been employing fuel treatment techniques to reduce wildfire hazard for...
Author(s): Jolie Pollet, Philip N. Omi
Year Published: 2002
Type: Document
Book or Chapter or Journal Article

**Effects of wildfire and post-fire salvage logging on avian communities in conifer-dominated forests of the western United States**
[www.nrfirescience.org/resource/7956](http://www.nrfirescience.org/resource/7956)
Description not entered
Author(s): Natasha B. Kotliar, Sallie Hejl, Richard L. Hutton, Victoria A. Saab, C. P. Melcher, Mary E. McFadzen
Year Published: 2002
Type: Document
Book or Chapter or Journal Article

**Use of fire and silvicultural techniques for whitebark pine restoration successes, caveats, and assessment techniques**
[www.nrfirescience.org/resource/10982](http://www.nrfirescience.org/resource/10982)
Whitebark pine (Pinus albicaulis) is a keystone species in upper subalpine forests of many parts of the northern Rocky Mountains and Cascades in the United States and Canada. These diverse ecosystems have been declining in parts of its range because of recent mountain pine beetle (Dentroctonous ponderosae) and blister rust (...)
Author(s): Robert E. Keane, Katherine Kendall, Robert Crabtree
Year Published: 2002
Type: Document
Conference Proceedings
Ponderosa pine ecosystems restoration and conservation: steps toward stewardship; April 25-27, 2000; Flagstaff, AZ
www.nrfirescience.org/resource/11888
This volume is divided into three sections: (1) Ecological, Biological, and Physical Science; (2) Social and Cultural; and (3) Economics and Utilization. Effective ecological restoration requires a combination of science and management. The authors of the first section exemplified this integration in the course of addressing a broad...
Author(s): Regina K. Vance, Carleton B. Edminster, W. Wallace Covington, Julie A. Blake
Year Published: 2001
Type: Document
Conference Proceedings

Maintaining the mosaic: the role of indigenous burning in land management
www.nrfirescience.org/resource/16097
This article highlights the findings of the literature on aboriginal fire from the human- and the land-centered disciplines, and suggests that the traditional knowledge of indigenous peoples be incorporated into plans for reintroducing fire to the nation's forests. Traditional knowledge represents the outcome of long experimentation...
Author(s): R.W. Kimmerer, Frank K. Lake
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Restoration concepts and techniques
www.nrfirescience.org/resource/8399
Innovative techniques are needed to restore the health of whitebark pine (Pinus albicaulis) communities in the northern Rocky Mountains of the United States, inland West, and adjacent areas of Canada, because of the detrimental effects of the exotic disease white pine blister rust (Cronartium ribicola) coupled with fire exclusion...
Author(s): Robert E. Keane, Stephen F. Arno
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Alternative ponderosa pine restoration treatments in the western United States
www.nrfirescience.org/resource/8409
Compared to presettlement times, many ponderosa pine forest of the United States are now more dense and have greater quantities of fuels. Widespread treatments are needed in these forests to restore ecological integrity and to reduce the risk of uncharacteristically severe fires. Among possible restorative treatments, however, the...
Author(s): James D. McIver, Charles P. Weatherspoon, Carleton B. Edminster
Year Published: 2001
Type: Document
Conference Proceedings

Can the fire-dependent whitebark pine be saved?
www.nrfirescience.org/resource/7927
In recent decades, whitebark pine has been declining due to epidemics and fire exclusion (Keane and Arno 1993; Kendall and Arno 1990). In the northern Rocky Mountains, a project is underway to explore
the feasibility of using fire and silviculture to restore the tree’s high-elevation habitat.
Author(s): Robert E. Keane
Year Published: 2001
Type: Document
Book or Chapter or Journal Article, Synthesis

Real-time smoke particulate sampling; fire storm 2000
www.nrfirescience.org/resource/11202
Reports the findings of a study comparing the results of instruments measuring smoke particulate in real time to gravimetric samplers in Missoula and Hamilton, Montana, during the summer of 2000. Real-time, particulate monitoring instruments were evaluated to determine their accuracy when measuring smoke particulate concentrations...
Author(s): Andy Trent, Mary A. Davies, Richard Karsky, Richard W. Fisher
Year Published: 2001
Type: Document
Technical Report or White Paper

Strategies for managing whitebark pine in the presence of white pine blister rust
www.nrfirescience.org/resource/7902
Description not entered
Author(s): Raymond J. Hoff, Dennis E. Ferguson, Geral I. McDonald, Robert E. Keane
Year Published: 2001
Type: Document
Book or Chapter or Journal Article, Synthesis

Fire and invasive species within the temperate and boreal coniferous forests of western North America
www.nrfirescience.org/resource/10966
Invasive, nonnative plant species have been a concern of land managers within the temperate and boreal coniferous forest eco-region for nearly a century. Fire management, timber harvest, grazing, mining, recreation, and agriculture have not only exacerbated invasive species establishment and spread, but have been impacted by such...
Author(s): Richy J. Harrod, Sarah Reichard
Year Published: 2000
Type: Document
Conference Proceedings, Synthesis

Building consensus: legitimate hope or seductive paradox?
www.nrfirescience.org/resource/11186
To understand how participants in a natural resource planning situation described the nature of consensus, we interviewed scientists, agency planners and managers, and public representatives in two planning processes on the Bitterroot National Forest in west-central Montana. While most interviewees felt the agency had included...
Author(s): Stephen F. McCool, Kathleen Guthrie, Jane Kapler Smith
Year Published: 2000
Type: Document
Technical Report or White Paper

The use of shaded fuelbreaks in landscape fire management
www.nrfirescience.org/resource/8372
Shaded fuelbreaks and larger landscape fuel treatments, such as prescribed fire, are receiving renewed interest as forest protection strategies in the western United States. The effectiveness of fuelbreaks remains a subject of debate because of differing fuelbreak objectives, prescriptions for creation and maintenance, and their...

Author(s): James K. Agee, Bernhard Bahro, Mark A. Finney, Philip N. Omi, David B. Sapsis, Carl N. Skinner, Jan W. van Wagendonk, Charles P. Weatherspoon
Year Published: 2000
Type: Document
Book or Chapter or Journal Article, Synthesis

Synergy between ecological needs and economic aspects of ecosystem restoration

www.nrfirescience.org/resource/11050
The implementation of properly designed treatments to restore and sustain desired forest conditions in the Inland Northwest, besides moving forest stands more rapidly to an ecologically desirable and sustainable condition, can generate positive revenues from the timber to be removed. These treatments also have potential to increase...

Author(s): Charles E. Keegan, Carl E. Fiedler
Year Published: 2000
Type: Document
Technical Report or White Paper

Mixed-severity fire regimes in the Northern Rocky Mountains: consequences of fire exclusion and options for the future

www.nrfirescience.org/resource/8426
Findings from fire history studies have increasingly indicated that many forest ecosystems in the northern Rocky Mountains were shaped by mixed-severity fire regimes, characterized by fires of variable severities at intervals averaging between about 30 and 100 years. Perhaps because mixed-severity fire regimes and their resulting...

Author(s): Stephen F. Arno, David J. Parsons, Robert E. Keane
Year Published: 2000
Type: Document
Conference Proceedings, Synthesis

Landscape trends (1753-1993) of whitebark pine (Pinus albicaulis) forests in the west big hole range of Idaho/Montana

www.nrfirescience.org/resource/7965
Pinus albicaulis (whitebark pine) is an important tree species in subalpine forests of the Northern Rocky Mountains. Populations have been declining at unprecedented rates due to the introduction of an exotic pathogen and fire suppression. We initiated this study to evaluate historical trends in Pinus albicaulis abundance along with...

Author(s): Michael P. Murray, Stephen C. Bunting, Michael P. Murray
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Silvicultural treatments

www.nrfirescience.org/resource/11891
Sustainable, ecologically-based management of pine/fir forests requires silviculturists to integrate several treatments that emulate historic disturbance processes. Restoration prescriptions typically include cleaning or heavy understory thinning, improvement cutting to reduce the proportion of firs, and modified selection cutting...
Toward an integrated classification of ecosystems: defining opportunities for managing fish and forest health

Many of the aquatic and terrestrial ecosystems of the Pacific Northwest United States have been simplified and degraded in part through past land-management activities. Recent listings of fishes under the Endangered Species Act and major new initiatives for the restoration of forest health have precipitated contentious debate among...

Author(s): Bruce E. Rieman, Paul F. Hessburg, Danny C. Lee, Russell F. Thurow, James R. Sedell
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Proceedings: ecology and management of pinyon-juniper communities within the Interior West; September 15-18, 1997; Provo, UT

A symposium held September 15-18, 1997, in Provo, UT, and Sanpete County, UT, provided information on the ecology, management, resource values, and restoration of pinyon-juniper communities in the Interior Western United States. The conference was hosted by the USDA Forest Service, Rocky Mountain Research Station and the Utah...

Author(s): Stephen B. Monsen, Richard Stevens
Year Published: 1999
Type: Document
Conference Proceedings

Use of the helitorch to enhance diversity on riparian corridors in mature pinyon-juniper communities: a conceptual approach

As pinyon-juniper have increased their dominance throughout the Great Basin, other perennial plants have declined in abundance. Riparian areas traditionally have the greatest biodiversity found in the region. The increase of pinyon-juniper can generally be attributed to a change in the disturbance regime. To increase the plant...

Author(s): G. Allen Rasmussen, Robin J. Tausch, Stephen C. Bunting
Year Published: 1999
Type: Document
Conference Proceedings

Birds in a sagebrush sea: Managing sagebrush habitat for bird communities

This booklet presents land management recommendations to help bird communities in sagebrush habitats. It was prepared for the Western Working Group of Partners in Flight, a partnership of private citizens, industry groups, government agencies, universities, nongovernment organizations, and others interested in bird conservation. Why...

Author(s): Christine Paige, Sharon Ritter
Year Published: 1999
Type: Document
Management or Planning Document
Responses of cavity-nesting birds to stand-replacement fire and salvage logging in ponderosa pine/douglas-fir forests of southwestern Idaho
www.nrfirescience.org/resource/11413
From 1994 to 1996, researchers monitored 695 nests of nine cavity-nesting bird species and measured vegetation at nest sites and at 90 randomly located sites in burned ponderosa pine forests of southwestern Idaho. Site treatments included two types of salvage logging, and unlogged controls. All bird species selected nest sites with...
Author(s): Victoria A. Saab, Jonathan G. Dudley
Year Published: 1998
Type: Document
Technical Report or White Paper

Length and timing of grazing on postburn productivity of two bunchgrasses in an Idaho experimental range
www.nrfirescience.org/resource/8213
Plant mortality and productivity in semiarid grasslands may be affected by the length of time grazing is excluded during the postfire regeneration period. The degree of grazing tolerance for the semiarid bunchgrass species, Festuca idahoensis and Agropyron spicatum, exposed to fire, and how the variation in grazing tolerance was...
Author(s): Stephen C. Bunting, Ronald Robberecht, Guillermo E. Defosse
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

Appendix A - Biological assessment, TCEF research project for Lewis and Clark National Forest
www.nrfirescience.org/resource/11505
An environmental analysis has been prepared which describes and evaluates the management alternatives for the timber harvest and burning within the Tenderfoot Creek Experimental Forest (TCEF) project area. The project area lies within the headwaters of the Tenderfoot drainage of the Lewis and Clark National Forest. The purpose of...
Author(s): Donald Godtel
Year Published: 1998
Type: Document
Management or Planning Document

Environmental assessment: Tenderfoot Creek Experimental Forest - Vegetative treatment research project, Kings Hill Ranger District, Lewis and Clark National Forest, Meagher County, Montana
www.nrfirescience.org/resource/11513
Environmental assessment of the Tenderfoot Research Project. This research project proposes to harvest timber in two treatment subwatersheds, Spring Park Creek and Sun Creek. The silvicultural system proposed is a two-aged system termed 'shelterwood with reserves,' that uses even distribution of single or small groups and uneven...
Author(s): Gloria E. Flora, Ward W. McCaughey
Year Published: 1998
Type: Document
Management or Planning Document

Restoring fire in lodgepole pine forests of the Intermountain West
We are developing new management treatments for regenerating and sustaining lodgepole pine (Pinus contorta) forests through emulation of natural disturbance processes. Lodgepole pine is the principal forest cover on over 26 million hectares in western North America. While infrequent, stand replacing fires following mountain pine...

Wildfire and native fish: issues of forest health and conservation of sensitive species
Issues related to forest health and the threat of larger, more destructive wildfires have led to major new initiatives to restructure and recompose forest communities in the western United States. Proposed solutions will depend, in part, on silvicultural treatments and prescribed burning. Large fires can produce dramatic changes in...

Vegetation structure in old-growth stands in the Coram Research Natural Area in northwestern Montana
Forest stand structure, understory composition, and tree seedling composition are described for eight permanent tenth-hectare plots established in Engelmann spruce/subalpine fir, western larch, and interior Douglas-fir forest cover types in northwestern Montana. Sites have been protected as examples of old-growth stands since the...

Decision support systems for ecosystem management: an evaluation of existing systems
This report evaluates 24 computer-aided decision support systems (DSS) that can support management decision-making in forest ecosystems. It compares the scope of each system, spatial capabilities, computational methods, development status, input and output requirements, user support availability, and system performance....

Coarse-scale restoration planning and design in Interior Columbia River Basin ecosystems: an example for restoring declining whitebark pine forests
During the last 2 years, many people from numerous government agencies and private institutions compiled a scientific assessment of the natural and human resources of the Interior Columbia River Basin (Jensen and Bourgeron 1993). This assessment is meant to guide the development of a coarse-scale Environmental Impact Statement for...
Silvicultural applications: restoring ecological structure and process in ponderosa pine forests

A primary goal of restoration treatments in ponderosa pine (Pinus ponderosa)/fir forests is to create more open stand structures, thereby improving tree vigor and reducing vulnerability to insects, disease, and severe fire. An additional goal in some stands is to manipulate existing species composition and site conditions to favor...

The concept: restoring ecological structure and process in ponderosa pine forests

Elimination of the historic pattern of frequent low-intensity fires in ponderosa pine and pine-mixed conifer forests has resulted in major ecological disruptions. Prior to 1900, open stands of large, long-lived, fire-resistant ponderosa pine were typical. These were accompanied in some areas by other fire-dependent species such as...

Examples of fire restoration in Glacier National Park

Covering just over 1 million acres, Glacier National Park straddles the Continental Divide in northwestern Montana. Diverse vegetation communities include moist western cedar- western hemlock (Thuja plicata - Tsuga heterophylla) old growth forests similar to those of the Pacific Coast, dry western grasslands and prairies, dense...

Prescribed fire applications: restoring ecological structure and process in ponderosa pine forests

The decision to include the fire process as part of a restoration treatment for a particular forest site is most logically made in conjunction with the decision for a silvicultural treatment. In other words, forest managers do not typically wait to visually or quantitatively evaluate the post harvest site before deciding whether or...
Reestablishing fire-adapted communities to riparian forests in the ponderosa pine zone

Ecological research has implicated the practice of fire exclusion as a major contributor to forest health problems in the semiarid ponderosa pine (Pinus ponderosa) zone of the Inland West (Mutch and others 1993; Sampson and others 1994). Prior to 1900, frequent, low-intensity fires occurred on upland forests in this forest zone at...

Author(s): Matthew K. Arno
Year Published: 1996
Type: Document
Technical Report or White Paper

Restoring recreational and residential forests

Several decades of fire suppression following logging around the turn-of-the-century has produced dense, evenage stands of ponderosa pine (Pinus ponderosa) and Douglas-fir (Pseudotsuga menziesii). They contrast with the original forests where frequent, low-intensity fires gave rise to open, parklike, and often uneven-age stands of...

Author(s): Joe H. Scott
Year Published: 1996
Type: Document
Technical Report or White Paper

The use of fire in forest restoration

The 26 papers in this document address the current knowledge of fire as a disturbance agent, fire history and fire regimes, applications of prescribed fire for ecological restoration, and the effects of fire on the various forested ecosystems of the north-western United States. The main body of this document is organized in three...

Author(s): Colin C. Hardy, Stephen F. Arno
Year Published: 1996
Type: Document
Technical Report or White Paper

Restoring historic landscape patterns through management: restoring fire mosaics on the landscape

Seral, fire dependent lodgepole pine (Pinus contorta Dougl.) communities are an important component of upper elevation forests throughout the Northern Rockies, where they cover 4 million acres, or about 17 percent of the land base. On the Bitterroot National Forest, lodgepole pine occurs mostly between 5,500 and 7,500 feet.

Author(s): Catherine A. Stewart
Year Published: 1996
Type: Document
Technical Report or White Paper

Ecological implications of sagebrush manipulation: A literature review

The Montana Department of Fish, Wildlife & Parks (FWP) has long recognized the importance of sagebrush/grassland vegetative communities as wildlife habitat. Efforts to manipulate these communities concern FWP because of the potential implications to wildlife. Some groups believe sagebrush control generally will have beneficial...
Social and political issues in ecological restoration
www.nrfirescience.org/resource/12415
There are four major questions affecting the future of ecological restoration. The first and most serious question is philosophical. Should we attempt to restore ecosystems? Some people want to separate humans from nature because they believe that human intervention is bad or imperfect. They define "natural" as the absence of human...

Germination and establishment ecology of big sagebrush: Implications for community restoration
www.nrfirescience.org/resource/15421
Big sagebrush (Artemisia tridentata) seedling recruitment is limited by seed production and dispersal in space and time, by genetic constraints of specific ecotypes, and by environmental factors that include weather, microsite attributes, soil microbiota, herbivory, and inter- and intraspecific competition.

Rapid decline of whitebark pine in western Montana: evidence from 20-year re-measurements
www.nrfirescience.org/resource/12916
Whitebark pine (Pinus albicaulis), an important producer of food for wildlife, is decreasing in abundance in western Montana due to attacks by the white pine blister rust fungus (Cronartium ribicola), epidemics of mountain pine beetle (Dendroctonus ponderosae) and successional replacement mainly by subalpine fir (Abies lasiocarpa)....

Deterioration of fire-killed and fire-damaged timber in the Western United States
www.nrfirescience.org/resource/11159
Fire-killed and fire-damaged timber are an important source of fiber and are becoming more important because of a decrease in the land base available for timber harvest. Forest managers need to know the causes of deterioration and degrade, the expected losses in product volume and value, and the impact of time on deterioration. This....

GIS applications to the indirect effects of forest fires in mountainous terrain
www.nrfirescience.org/resource/12032
Snow-avalanche paths and landslides are common geomorphic features in Glacier National Park (GNP), Montana, and represent hazards to human occupancy and utilization of the park. Forest fires have been spatially extensive there, and it is well documented that areas subjected to forest fires become increasingly susceptible to...
Author(s): David R. Butler, Stephen J. Walsh, George P. Malanson
Year Published: 1991
Type: Document
Technical Report or White Paper

Twenty-year natural regeneration following five silvicultural prescriptions in spruce-fir forests of the intermountain west
www.nrfirescience.org/resource/11965
No single combination of five cutting-site preparation treatments resulted in superior natural regeneration in spruce-fir stands in Wyoming, Utah, and Idaho. Best results were generally obtained by partial cutting, with minimal disturbance of litter and organic matter, especially on harsh, high-elevation sites. Most sites remained...
Author(s): Ward W. McCaughey, Carl E. Fiedler, Wyman C. Schmidt
Year Published: 1991
Type: Document
Technical Report or White Paper

Some thoughts on prescribed natural fires
www.nrfirescience.org/resource/12420
Wildland fire is a significant component of nearly all North American ecosystems. High intensity, stand-replacement fires are normal in certain ecosystems, especially in the northern Rocky Mountains. Wilderness fire managers are obligated to let fire operate as a natural influence to the extent that this is possible. Where...
Author(s): Jack D. Cohen
Year Published: 1991
Type: Document
Technical Report or White Paper

Adaptive fire policy
www.nrfirescience.org/resource/12424
Adaptive resource management is a continuous learning process in which current knowledge always leads to further experimentation and discovery. Adaptive management evolves by learning from mistakes. Designing adaptive management strategies involves four tasks. First, the problem must be defined and bounded. There is growing...
Author(s): James M. Saveland
Year Published: 1991
Type: Document
Conference Proceedings, Technical Report or White Paper

Proceedings-symposium on whitebark pine ecosystems: Ecology and management of a high-mountain resource
www.nrfirescience.org/resource/20057
Includes 52 papers and 14 poster synopses that present current knowledge about ecosystems where whitebark pine and associated flora and fauna predominate. This was the first symposium to explore the ecology and management of these ecosystems, which are becoming increasingly important.
Silvicultural management alternatives for whitebark pine
www.nrfirescience.org/resource/19287
Whitebark pine (Pinus albicaulis) has received little management emphasis except in the past 10 years. Silvicultural treatment of whitebark pine is starting to draw increased interest as attention is focused on the species and its potential management. The objective of this paper is to summarize what is currently known about the...
Author(s): Douglas E. Eggers
Year Published: 1990
Type: Document
Conference Proceedings

Hydrocarbon and biomass fuel fire field tests
www.nrfirescience.org/resource/11021
Biomass and hydrocarbon fuel fires are two common sources of obscuring smoke which present significant operational challenges over a broad range of possible viewing wavelengths. This is especially true of very large fires where the primary smoke particles (approx. 0.1-0.3 um diameter) obscure vision by both scattering and absorption...
Author(s): Lawrence F. Radke, Dean A. Hegg, J. David Nance, Jaime H. Lyons, Krista K. Laursen, R. J. Ferek, Peter V. Hobbs, Raymond E. Weiss
Year Published: 1990
Type: Document
Conference Proceedings

Landscape and ecosystem-level management in whitebark pine ecosystems
www.nrfirescience.org/resource/19288
To provide adequate resource protection in alpine and subalpine areas, managers need to expand their perspective and focus on ecosystem and landscape-level management. Single-resource and microsite focuses stymie integrated management and protection plans. A landscape perspective is outlined for the Northern Rocky Mountains,...
Author(s): Wendel J. Hann
Year Published: 1990
Type: Document
Conference Proceedings

Timber management and target stands in the whitebark pine zone
www.nrfirescience.org/resource/19284
Regardless of the mixture of land management objectives, quantification of the type of stands that will meet these objectives, target stands, is needed. Quantification of target stands is essential as the starting point for the diagnosis of treatment needs and to achieve consistency over time in the interpretation of a given...
Author(s): Jimmie D. Chew
Year Published: 1990
Type: Document
Conference Proceedings

Vegetation response to helicopter logging and broadcast burning in Douglas-fir habitat types at
Shrub frequency, cover, and height, and herb frequency and cover were measured on plots from two Douglas-fir habitat types in three cutting units. The plots were measured prior to helicopter yarding and broadcast burning and then 1, 2, 5, and 10 years later. The broadcast burning was more severe on one cutting unit than the other...

Author(s): Kathy Geier-Hayes
Year Published: 1989
Type: Document
Technical Report or White Paper

More intensive management could be applied to many young stands in conifer forests of the Northern Rockies. Vast areas are stocked with stands that contain a mixture of conifer species. An important mixed species cover type in this region is the western larch type (formerly called the larch-Douglas-fir type...)

Author(s): Dennis M. Cole, Wyman C. Schmidt
Year Published: 1986
Type: Document
Technical Report or White Paper

This publication is not available online. It will have to be ordered from a library.

Author(s): Kendall L. Johnson
Year Published: 1986
Type: Document
Conference Proceedings

Based on limited data, water-gel provided a slightly wider and deeper fireline with more feathering of ejected material than did Ensign-Bickford cord. Soil moisture conditions, closeness of blasting material to the ground, and other factors may explain these differences.

Author(s): Richard J. Barney
Year Published: 1984
Type: Document
Research Brief or Fact Sheet

Influences of livestock grazing on community structure, fire intensity, and normal fire frequency in the Douglas-fir/ninebark (Pseudotsuga menziesii/Physocarpus malvaceus) habitat type were studied at the University of Idaho's experimental forest in northern Idaho. Livestock grazing caused increased tree numbers...

Author(s): G. Thomas Zimmerman, Leon F. Neuenschwander
Year Published: 1984
Type: Document
Book or Chapter or Journal Article
Early postfire revegetation in a western Montana Douglas-fir forest
www.nrfirescience.org/resource/11960
Development of natural vegetation and seeded grasses on a severely burned Douglas-fir forest area is described for the first 5 postfire years. Results are described separately for ravine and upland sites. Results of special studies of moss recovery and tree seedling distribution are also reported.
Author(s): Marilyn F. Crane, James R. Habeck, William C. Fischer
Year Published: 1984
Type: Document
Technical Report or White Paper

The sagebrush-grass region: A review of the ecological literature
www.nrfirescience.org/resource/15435
The objective of this paper is to provide a comprehensive review of literature on the vegetation of the sage brush region of North America. Despite its prime importance as a grazing resource, and the problems produced by its use and misuse, research on this large and va ried ecosystem was quite limited during the first half of this...
Author(s): E.W. Tisdale, M. Hironaka
Year Published: 1981
Type: Document
Synthesis

Wildland fire research needs in the West: Forest Service managers' views
www.nrfirescience.org/resource/11910
This report discusses fire-related research needs in the western regions of the Forest Service. These needs were expressed by personnel at all management levels. Responses were one part of a more general study designed to establish information requirements for integrating fire into land management planning.
Author(s): Richard J. Barney
Year Published: 1979
Type: Document
Technical Report or White Paper

Vegetal development on the Sleeping Child burn in western Montana, 1961 to 1973
www.nrfirescience.org/resource/11951
In the year following the 1961 Sleeping Child forest fire on the Bitterroot National Forest, Montana, 11 permanent transects were established within the burn. Vegetation development was recorded through 1973, but only four transects were considered indicative of seral forest succession independent of superimposed management...
Author(s): L. Jack Lyon
Year Published: 1976
Type: Document
Technical Report or White Paper

The Impacts of Wildfire Characteristics and Employment on the Adaptive Management Strategies in the Intermountain West
www.nrfirescience.org/resource/18758
Widespread development and shifts from rural to urban areas within the Wildland-Urban Interface (WUI) has increased fire risks to local populations, as well as introduced complex and long-term costs and benefits to communities. We use an interdisciplinary approach to investigate how trends in fire
Changes in forest structure since 1860 in ponderosa pine dominated forests in the Colorado and Wyoming Front Range, USA

Management practices since the late 19th century, including fire exclusion and harvesting, have altered the structure of ponderosa pine (Pinus ponderosa Douglas ex P. Lawson & C. Lawson) dominated forests across the western United States. These structural changes have the potential to contribute to uncharacteristic wildfire.

Author(s): Michael A. Battaglia, Benjamin Gannon, Peter M. Brown, Paula J. Fornwalt, Anthony S. Cheng, Laurie S. Huckaby
Type: Document
Book or Chapter or Journal Article