Land surveys show regional variability of historical fire regimes and structure of dry forests of the western USA
www.nrfirescience.org/resource/16421
An understanding of how historical fire and structure in dry forests (ponderosa pine, dry mixed conifer) varied across the western USA remains incomplete. Yet, fire strongly affects ecosystem services, and forest restoration programs are underway. We used General Land Office survey reconstructions from the late-1800s across 11...
Author(s): William L. Baker, Mark A. Williams
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Mulching fuels treatments promote understory plant communities in three Colorado, USA, coniferous forest types
www.nrfirescience.org/resource/14906
Mulching fuels treatments have been increasingly implemented by forest managers in the western USA to reduce crown fire hazard. These treatments use heavy machinery to masticate or chip unwanted shrubs and small-diameter trees and broadcast the mulched material on the ground. Because mulching treatments are relatively novel and have...
Author(s): Paula J. Fornwalt, Monique E. Rocca, Michael A. Battaglia, Charles C. Rhoades, Michael G. Ryan
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Long-term effects of fuel treatments on aboveground biomass accumulation in ponderosa pine forests of the northern Rocky Mountains
www.nrfirescience.org/resource/15543
Fuel treatments in ponderosa pine forests of the northern Rocky Mountains are commonly used to modify fire behavior, but it is unclear how different fuel treatments impact the subsequent production and distribution of aboveground biomass, especially in the long term. This research evaluated aboveground biomass responses 23 years...
Author(s): Kate A. Clyatt, Christopher R. Keyes, Sharon M. Hood
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

The normal fire environment - modeling environmental suitability for large forest wildfires using past, present, and future climate normals
www.nrfirescience.org/resource/15206
We modeled the normal fire environment for occurrence of large forest wildfires (>40 ha) for the Pacific Northwest Region of the United States. Large forest wildfire occurrence data from the recent climate normal period (1971-2000) was used as the response variable and fire season precipitation, maximum temperature, slope,...
Author(s): Raymond J. Davis, Zhiqiang Yang, Cole Belongie, Warren B. Cohen
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**

**Mixed-severity fire and salvage logging in dry forests of Oregon's western Cascades**  
[www.nrfirescience.org/resource/15054](http://www.nrfirescience.org/resource/15054)  
Interest in PNW forests is shifting from a focus on old-growth forests alone to include the ecological value and processes of early-seral communities. However, focusing on the alpha and omega states of a linear successional model does not account for the suite of conditions derived from mixed-severity fire common in many forests....

**Author(s):** Christopher J. Dunn, John D. Bailey  
**Year Published:** 2017  
**Type:** Document  
**Technical Report or White Paper**

**Quantifying the effect of elevation and aspect on fire return intervals in the Canadian Rocky Mountains**  
[www.nrfirescience.org/resource/15032](http://www.nrfirescience.org/resource/15032)  
The effect of topography on wildfire distribution in the Canadian Rockies has been the subject of debate. We suspect the size of the study area, and the assumption fire return intervals are distributed as a Weibull distribution used in many previous studies may have obscured the real effect of topography on these fire-regulated....

**Author(s):** Marie-Pierre Rogeau, Glen W. Armstrong  
**Year Published:** 2017  
**Type:** Document  
**Book or Chapter or Journal Article**

**Effects of fire radiative energy density dose on Pinus contorta and Larix occidentalis seedling physiology and mortality**  
[www.nrfirescience.org/resource/14914](http://www.nrfirescience.org/resource/14914)  
Climate change is projected to exacerbate the intensity of heat waves and drought, leading to a greater incidence of large and high-intensity wildfires in forested ecosystems. Predicting responses of seedlings to such fires requires a process-based understanding of how the energy released during fires affects plant physiology and...

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

**Simulated fire behaviour in young, postfire lodgepole pine forests**  
[www.nrfirescience.org/resource/16291](http://www.nrfirescience.org/resource/16291)  
Early-seral forests are expanding throughout western North America as fire frequency and annual area burned increase, yet fire behaviour in young postfire forests is poorly understood. We simulated fire behaviour in 24-year-old lodgepole pine (Pinus contorta var. latifolia) stands in Yellowstone National
Short-term ecological consequences of collaborative restoration treatments in ponderosa pine forests of Colorado

Ecological restoration treatments are being implemented at an increasing rate in ponderosa pine and other dry conifer forests across the western United States, via the USDA Forest Service’s Collaborative Forest Landscape Restoration (CFLR) program. In this program, collaborative stakeholder groups work with National Forests (NFs)...

Decomposition rates for hand-piled fuels

Hand-constructed piles in eastern Washington and north-central New Mexico were weighed periodically between October 2011 and June 2015 to develop decay-rate constants that are useful for estimating the rate of piled biomass loss over time. Decay-rate constants (k) were determined by fitting negative exponential curves to time series...

Does the presence of large down wood at the time of a forest fire impact soil recovery?

Fire may remove or create dead wood aboveground, but it is less clear how high severity burning of soils affects belowground microbial communities and soil processes, and for how long. In this study, we investigated soil fungal and bacterial communities and biogeochemical responses of severely burned “red” soil and less severely...

Spatially explicit measurements of forest structure and fire behavior following restoration treatments in dry forests

Restoration treatments in dry forests of the western US often attempt silvicultural practices to restore the historical characteristics of forest structure and fire behavior. However, it is suggested that a reliance on non-spatial metrics of forest stand structure, along with the use of wildland fire behavior models that lack the...
Impacts of fire radiative flux on mature Pinus ponderosa growth and vulnerability to secondary mortality agents
www.nrfirescience.org/resource/14915
Recent studies have highlighted the potential of linking fire behaviour to plant ecophysiology as an improved route to characterising severity, but research to date has been limited to laboratory-scale investigations. Fine-scale fire behaviour during prescribed fires has been identified as a strong predictor of post-fire tree...
Author(s): Aaron M. Sparks, Alistair M. S. Smith, Alan F. Talhelm, Crystal A. Kolden, Kara M. Yedinak, Daniel M. Johnson
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Effects of prescribed fire on wildlife and wildlife habitat in selected ecosystems of North America
www.nrfirescience.org/resource/14715
Prescribed fire is applied widely as a management tool in North America to meet various objectives such as reducing fuel loads and fuel continuity, returning fire to an ecosystem, enhancing wildlife habitats, improving forage, preparing seedbeds, improving watershed conditions, enhancing nutrient cycling, ...
Author(s): William M. Block, L. Mike Conner, Paul A. Brewer, Paulette Ford, Jonathan Haufler, Andrea Litt, Ronald E. Masters, Laura R. Mitchell, Jane Park
Year Published: 2016
Type: Document
Technical Report or White Paper

Can pore-clogging by ash explain post-fire runoff?
www.nrfirescience.org/resource/13995
Ash plays an important role in controlling runoff and erosion processes after wildfire and has frequently been hypothesised to clog soil pores and reduce infiltration. Yet evidence for clogging is incomplete, as research has focussed on identifying the presence of ash in soil; the actual flow processes remain unknown. We conducted...
Author(s): Cathelijine Stoof, Anouk I. Gevaert, Christine Baver, Bahareh Hassanpour, Veronica L. Morales, Wei Zhang, Deborah A. Martin, Shree K. Giri, Tammo S. Steenhuis
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Forest disturbance interactions and successional pathways in the Southern Rocky Mountains
www.nrfirescience.org/resource/14423
The pine forests in the southern portion of the Rocky Mountains are a heterogeneous mosaic of disturbance and recovery. The most extensive and intensive stress and mortality are received from human activity, fire, and mountain pine beetles (MPB; Dendroctonus ponderosae). Understanding disturbance interactions and disturbance-....
Author(s): Lu Liang, Todd J. Hawbaker, Zhiliang Zhu, Xuecao Li, Peng Gong
Year Published: 2016
Type: Document
Book or Chapter or Journal Article
Variables associated with the occurrence of Ips beetles, red turpentine beetle and wood borers in live and dead ponderosa pines with post-fire injury

www.nrfirescience.org/resource/14690

Recently, wildfires and prescribed burning have become more frequent in conifer forests of western North America. Most studies examining the impacts of insects on trees with post-fire injury have focused on contributions to tree mortality. Few studies have examined fire-caused injuries to estimate the probability of attack by...

Author(s): Jose F. Negron, Joel D. McMillin, Carolyn Hull Sieg, James F. Fowler, Kurt K. Allen, Linda L. Wadleigh, John A. Anhold, Ken E. Gibson
Year Published: 2016
Type: Document

Relating fire-caused change in forest structure to remotely sensed estimates of fire severity

www.nrfirescience.org/resource/14891

Fire severity maps are an important tool for understanding fire effects on a landscape. The relative differenced normalized burn ratio (RdNBR) is a commonly used severity index in California forests, and is typically divided into four categories: unchanged, low, moderate, and high. RdNBR is often calculated twice—from images...

Author(s): Jamie M. Lydersen, Brandon M. Collins, Jay D. Miller, Danny L. Fry, Scott L. Stephens
Year Published: 2016
Type: Document

Post-fire logging produces minimal persistent impacts on understory vegetation in northeastern Oregon, USA

www.nrfirescience.org/resource/14354

Post-fire forest management commonly requires accepting some negative ecological impacts from management activities in order to achieve management objectives. Managers need to know, however, whether ecological impacts from post-fire management activities are transient or cause long-term ecosystem degradation. We studied the long-...

Author(s): David W. Peterson, Erich K. Dodson
Year Published: 2016
Type: Document

Positive effects of fire on birds may appear only under narrow combinations of fire severity and time-since-fire

www.nrfirescience.org/resource/14642

We conducted bird surveys in 10 of the first 11 years following a mixed-severity fire in a dry, low-elevation mixed-conifer forest in western Montana, United States. By defining fire in terms of fire severity and time-since-fire, and then comparing detection rates for species inside 15 combinations of fire severity and time-since-...

Author(s): Richard L. Hutto, David A. Patterson
Year Published: 2016
Type: Document

Emissions from prescribed burning of timber slash piles in Oregon

www.nrfirescience.org/resource/14886
Emissions from burning piles of post-harvest timber slash (Douglas-fir) in Grande Ronde, Oregon were sampled using an instrument platform lofted into the plume using a tether-controlled aerostat or balloon. Emissions of carbon monoxide, carbon dioxide, methane, particulate matter (PM2.5), black carbon, ultraviolet absorbing PM,...

Author(s): Johanna Aurell, Brian K. Gullett, Dennis Tabor, Nick Yonker
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Response of native versus exotic plant guilds to cattle and elk herbivory in forested rangeland

Are exotic plant species favoured by non-native ungulate herbivores and disadvantaged by native herbivores in forested rangelands? Do the impacts of ungulates on exotic vs native plants depend on forest management activities such as prescribed fire and stand thinning? Location: Northeastern Oregon, USA. Methods: We recorded changes...

Author(s): Burak K. Pekin, Michael J. Wisdom, Catherine G. Parks, Bryan A. Endress, Bridgett J. Naylor
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Macroanatomy and compartmentalization of recent fire scars in three North American conifers

Fire scars are initiated by cambial necrosis caused by localized lethal heating of the tree stem. Scars develop as part of the linked survival processes of compartmentalization and wound closure. The position of scars within dated tree ring series is the basis for dendrochronological reconstruction of fire history. Macroanatomical...

Author(s): Kevin T. Smith, Estelle Arbellay, Donald A. Falk, Elaine Kennedy Sutherland
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Regeneration of montane forests 24 years after the 1988 Yellowstone fires: A fire-catalyzed shift in lower treelines?

Forests near the lower limit of montane tree cover are expected to be particularly vulnerable to warming climate, potentially converting to non-forest for prolonged periods if affected by canopy-removing disturbances. Such disturbance-catalyzed shifts are by nature stochastic, offering few opportunities to test these predictions. We...

Author(s): Daniel C. Donato, Brian J. Harvey, Monica G. Turner
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

U.S. federal fire and forest policy: emphasizing resilience in dry forests

Current U.S. forest fire policy emphasizes short-term outcomes versus long-term goals. This perspective drives managers to focus on the protection of high-valued resources, whether ecosystem-based or developed infrastructure, at the expense of forest resilience. Given these current and future challenges posed by wildland fire and...

Author(s): Scott L. Stephens, Brandon M. Collins, Eric Biber, Peter Z. Fule
Year Published: 2016
Does prescribed fire promote resistance to drought in low elevation forests of the Sierra Nevada, California, USA?
www.nrfirescience.org/resource/14244
Prescribed fire is a primary tool used to restore western forests following more than a century of fire exclusion, reducing fire hazard by removing dead and live fuels (small trees and shrubs). It is commonly assumed that the reduced forest density following prescribed fire also reduces competition for resources among the...
Author(s): Phillip J. van Mantgem, Anthony C. Caprio, Nathan L. Stevenson, Adrian J. Das
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Fire regimes of Northern Rocky Mountain ponderosa pine communities
www.nrfirescience.org/resource/14602
Hundreds of articles are published about wildland fires in Northern Rocky Mountain ponderosa pine communities. The author of this FEIS synthesis reviewed over 300 publications on historical and contemporary fuel loads, stand structure, and fire regimes in ponderosa pine communities. Most studies found that prior to fire exclusion,...
Author(s): Janet L. Fryer
Year Published: 2016
Type: Document
Synthesis, Technical Report or White Paper

Prior wildfires influence burn severity of subsequent large fires
www.nrfirescience.org/resource/14814
With longer and more severe fire seasons predicted, the incidence and extent of fires are expected to increase in western North America. As more area is burned, past wildfires may influence the spread and burn severity of subsequent fires, with implications for ecosystem resilience and fire management. We examined how previous burn...
Author(s): Camille Stevens-Rumann, Susan J. Prichard, Eva K. Strand, Penelope Morgan
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Management impacts on carbon dynamics in a Sierra Nevada mixed conifer forest
www.nrfirescience.org/resource/14230
Forest ecosystems can act as sinks of carbon and thus mitigate anthropogenic carbon emissions. When forests are actively managed, treatments can alter forests carbon dynamics, reducing their sink strength and switching them from sinks to sources of carbon. These effects are generally characterized by fast temporal dynamics. Hence...
Author(s): Sabina Dore, Danny L. Fry, Brandon M. Collins, Rodrigo Vargas, Robert A. York, Scott L. Stephens
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Increased water deficit decreases Douglas fir growth throughout western US forests
With ongoing public concern regarding climate change and recent drought that has affected many areas of the western United States, this study provides context and direct evidence for the negative impact of water stress on forest ecosystems. The response of trees to drought is a tangible example of the impacts of climate change on...

Author(s): David L. Peterson, Jeremy S. Littell
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Repeated wildfires alter forest recovery of mixed-conifer ecosystems

Most models project warmer and drier climates that will contribute to larger and more frequent wildfires. However, it remains unknown how repeated wildfires alter post-fire successional patterns and forest structure. Here, we test the hypothesis that the number of wildfires, as well as the order and severity of wildfire events...

Author(s): Camille Stevens-Rumann, Penelope Morgan
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Influences of vegetation disturbance on hydrogeomorphic response following wildfire

Quantifying the linkages between vegetation disturbance by fire and the changes in hydrologic processes leading to post-fire erosional response remains a challenge. We measured the influence of fire severity, defined as vegetation disturbance (using a satellite-derived vegetation disturbance index, VDI), landscape features that...

Author(s): Kevin D. Hyde, Kelsey Jencso, Andrew C. Wilcox, Scott W. Woods
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Avian relationships with wildfire at two dry forest locations with different historical fire regimes

Wildfire is a key factor influencing bird community composition in western North American forests. We need to understand species and community responses to wildfire and how responses vary regionally to effectively manage dry conifer forests for maintaining biodiversity. We compared avian relationships with wildfire burn severity...

Author(s): Quresh Latif, Jamie Sanderlin, Victoria A. Saab, William M. Block, Jonathan G. Dudley
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Burn me twice, shame on who? Interactions between successive forest fires across a temperate mountain region

Increasing rates of natural disturbances under a warming climate raise important questions about how multiple disturbances interact. Escalating wildfire activity in recent decades has resulted in some forests re-burning in short succession, but how the severity of one wildfire affects that of a subsequent wildfire is not fully...

Author(s): Brian J. Harvey, Daniel C. Donato, Monica G. Turner
Charred forests accelerate snow albedo decay: parameterizing the post-fire radiative forcing on snow for three years following fire  
www.nrfirescience.org/resource/14443
As large, high-severity forest fires increase and snowpacks become more vulnerable to climate change across the western USA, it is important to understand post-fire disturbance impacts on snow hydrology. Here, we examine, quantify, parameterize, model, and assess the post-fire radiative forcing effects on snow to improve hydrologic...
Author(s): Kelly E. Gleason, Anne W. Nolin
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Bark beetle-induced tree mortality alters stand energy budgets due to water budget changes  
www.nrfirescience.org/resource/14974
Insect outbreaks are major disturbances that affect a land area similar to that of forest fires across North America. The recent mountain pine bark beetle (Dendroctonus ponderosae) outbreak and its associated blue stain fungi (Grosmannia clavigera) are impacting water partitioning processes of forests in the Rocky Mountain region as...
Author(s): David E. Reed, Brent E. Ewers, Elise G. Pendall, John M. Frank, Robert Kelly
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States?  
www.nrfirescience.org/resource/14718
There is a widespread view among land managers and others that the protected status of many forestlands in the western United States corresponds with higher fire severity levels due to historical restrictions on logging that contribute to greater amounts of biomass and fuel loading in less intensively managed areas, particularly...
Author(s): Curtis M. Bradley, Chad T. Hanson, Dominick A. DellaSala
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review  
www.nrfirescience.org/resource/14425
The prevailing paradigm in the western U.S. is that the increase in stand-replacing wildfires in historically frequent-fire dry forests is due to unnatural fuel loads that have resulted from management activities including fire suppression, logging, and grazing, combined with more severe drought conditions and increasing...
Author(s): Elizabeth L. Kalies, Larissa L. Yocom Kent
Year Published: 2016
Type: Document
Book or Chapter or Journal Article, Synthesis
Spatial and temporal variations of fire regimes in the Canadian Rocky mountains and foothills of southern Alberta

www.nrfirescience.org/resource/14701

Like many fire-adapted ecosystems, decades of fire exclusion policy in the Rocky Mountains and Foothills natural regions of southern Alberta, Canada are raising concern over the loss of ecological integrity. Departure from historical conditions is evaluated using median fire return intervals (MdFRI) based on fire history data from...

Author(s): Michael D. Flannigan, Brad C. Hawkes, Marc-Andre Parisien, Marie-Pierre Rogeau, Rick Arthur

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Tamm Review: Management of mixed-severity fire regime forests in Oregon, Washington, and Northern California

www.nrfirescience.org/resource/13976

Increasingly, objectives for forests with moderate- or mixed-severity fire regimes are to restore successional diversity in landscapes that are resistant and resilient to current and future stressors. Maintaining native species and characteristic processes requires this successional diversity, but methods to achieve it are poorly...


Year Published: 2016

Type: Document

Book or Chapter or Journal Article, Synthesis

Detecting unburned areas within wildfire perimeters using Landsat and ancillary data across the northwestern United States

www.nrfirescience.org/resource/14897

Wildfires shape the distribution and structure of vegetation across the inland northwestern United States. However, fire activity is expected to increase given the current rate of climate change, with uncertain outcomes. A fire impact that has not been widely addressed is the development of unburned islands; areas within the fire...

Author(s): Arjan J. H. Meddens, Crystal A. Kolden, James A. Lutz

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Spatiotemporal variability of wildland fuels in US Northern Rocky Mountain forests

www.nrfirescience.org/resource/14689

Fire regimes are ultimately controlled by wildland fuel dynamics over space and time; spatial distributions of fuel influence the size, spread, and intensity of individual fires, while the temporal distribution of fuel deposition influences fire's frequency and controls fire size. These "shifting fuel mosaics" are both a cause and a...
Short-term impacts of fire-mediated habitat alterations on an isolated bighorn sheep population

Habitat alterations may improve and expand wildlife habitats, and bolster waning wildlife populations. We used global positioning system (GPS) locations to monitor 38 bighorn sheep (Ovis canadensis Shaw) that were translocated to the Seminoe Mountains, Wyoming, USA, in 2009 and 2010, and 24 bighorns captured in 2011 to investigate...

Author(s): Justin G. Clapp, Jeffrey L. Beck
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Forest fuels and potential fire behaviour 12 years after variable-retention harvest in lodgepole pine

Variable-retention harvesting in lodgepole pine offers an alternative to conventional, even-aged management. This harvesting technique promotes structural complexity and age-class diversity in residual stands and promotes resilience to disturbance. We examined fuel loads and potential fire behaviour 12 years after two modes of...

Author(s): Justin S. Crotteau, Christopher R. Keyes, Elaine Kennedy Sutherland, David K. Wright, Joel M. Egan
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Post-fire vegetation and fuel development influences fire severity patterns in reburns

In areas where fire regimes and forest structure have been dramatically altered, there is increasing concern that contemporary fires have the potential to set forests on a positive feedback trajectory with successive reburns, one in which extensive stand-replacing fire could promote more stand-replacing fire. Our study utilized an...

Author(s): Michelle Coppoletta, Kyle E. Merriam, Brandon M. Collins
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Influence of fire disturbance and biophysical heterogeneity on pre-settlement ponderosa pine and mixed conifer forests

Fire frequency is assumed to have exerted a strong influence on historical forest communities in the inland Pacific Northwest. This study reconstructs forest structure and composition in the year 1890 and fire frequency from 1760 to 1890 at 10 sites spanning a broad productivity gradient in the southern Blue Mountains of eastern...

Author(s): James D. Johnston, John D. Bailey, Christopher J. Dunn
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Do insect outbreaks reduce the severity of subsequent forest fires?

Understanding the causes and consequences of rapid environmental change is an essential scientific
frontier, particularly given the threat of climate- and land use-induced changes in disturbance regimes. In western North America, recent widespread insect outbreaks and wildfires have sparked acute concerns about potential insect—...

Author(s): Garrett W. Meigs, Harold S. Zald, John L. Campbell, William S. Keeton, Robert E. Kennedy
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Soil heating during the complete combustion of mega-logs and broadcast burning in central Oregon USA pumice soils
www.nrfirescience.org/resource/14604
The environmental effect of extreme soil heating, such as occurs with the complete combustion of large downed wood during wildfires, is a post-fire management concern to forest managers. To address this knowledge gap, we stacked logs to create 'mega-log' burning conditions and compared the temperature, duration and penetration...

Author(s): Jane E. Smith, Ariel D. Cowan, Stephen A. Fitzgerald
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Sensitivity of reconstructed fire histories to detection criteria in mixed-severity landscapes
www.nrfirescience.org/resource/14818
In heterogeneous forest landscapes prone to wildfires, accurate classification of the fire regime beyond direct observations and records is difficult. This is in part due to the methods used to reconstruct historical fires in complex, heterogeneous landscapes with varying fire severities. Mixed-severity fire regimes, defined as...

Author(s): Vanessa Stretch, Ze'ev Gedalof, Jacklyn Cockburn, Michael F. Pisaric
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Fortifying the forest: thinning and burning increase resistance to a bark beetle outbreak and promote forest resilience
www.nrfirescience.org/resource/14810
Fire frequency in low-elevation coniferous forests in western North America has greatly declined since the late 1800s. In many areas, this has increased tree density and the proportion of shade-tolerant species, reduced resource availability, and increased forest susceptibility to forest insect pests and high-severity wildfire. In...

Author(s): Sharon M. Hood, Stephen P. Baker, Anna Sala
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Altered mixed-severity fire regime has homogenised montane forests of Jasper National Park
www.nrfirescience.org/resource/14201
Fire suppression has altered the historical mixed-severity fire regime and homogenised forest structures in Jasper National Park, Canada. We used dendrochronology to reconstruct fire history and assess forest dynamics at 29 sites in the montane forests. Based on fire scars and even-aged post-fire cohorts, we determined 18 sites had...

Author(s): Raphael D. Chavardes, Lori D. Daniels
Year Published: 2016
Recovering lost ground: effects of soil burn intensity on nutrients and ectomycorrhiza communities of ponderosa pine seedlings

Fuel accumulation and climate shifts are predicted to increase the frequency of high-severity fires in ponderosa pine (Pinus ponderosa) forests of central Oregon. The combustion of fuels containing large downed wood can result in intense soil heating, alteration of soil properties, and mortality of microbes. Previous studies show...

Author(s): Ariel D. Cowan, Jane E. Smith, Stephen A. Fitzgerald
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Forest density preferences of homebuyers in the wildland-urban interface

In the fire-prone Western U.S., the scale of surrounding forest density can be realized by homebuyers as an amenity for aesthetics and cooling effects, or as a disamenity in terms of wildfire risk. There has been a lack of academic attention to understanding this duality of forest density preferences for homebuyers in at-risk...

Author(s): Evan Hjerpe, Yeon-Su Kim, Leah Dunn
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Burned forest characterization at single-tree level with airborne laser scanning for assessing wildlife habitat

Abundance, size, and spatial distribution of standing dead trees (snags), are key indicators of forest biodiversity and ecosystem health. These metrics represent critical habitat components for various wildlife species of conservation concern, including the Black-backed Woodpecker (Picoides arcticus), which is strongly associated...

Author(s): Angeles Casas, Mariano Garcia, Rodney B. Siegel, Alexander Koltunov, Carlos Ramirez, Susan L. Ustin
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Production possibility frontiers and socioecological tradeoffs for restoration of fire adapted forests

We used spatial optimization to analyze alternative restoration scenarios and quantify tradeoffs for a large, multifaceted restoration program to restore resiliency to forest landscapes in the western US. We specifically examined tradeoffs between provisional ecosystem services, fire protection, and the amelioration of key...

Author(s): Alan A. Ager, Michelle A. Day, Kevin C. Vogler
Year Published: 2016
Type: Document
Book or Chapter or Journal Article
A review of precipitation and temperature control on seedling emergence and establishment for ponderosa and lodgepole pine forest regeneration

www.nrfirescience.org/resource/14995

The persistence of ponderosa pine and lodgepole pine forests in the 21st century depends to a large extent on how seedling emergence and establishment are influenced by driving climate and environmental variables, which largely govern forest regeneration. We surveyed the literature, and identified 96 publications that reported data...

Author(s): M. D. Petrie, A. M. Wildeman, John Bradford, Robert M. Hubbard, William Lauenroth
Year Published: 2016
Type: Document
Book or Chapter or Journal Article, Synthesis

Spatial variability in tree regeneration after wildfire delays and dampens future bark beetle outbreaks

www.nrfirescience.org/resource/14737

Wildfires have increased in western North America, creating extensive areas of regenerating forests. There is concern that recent large, stand-replacing fires will synchronize forest development and commit landscapes to a future of increased disturbance, such as bark beetle outbreaks that require extensive, well-connected forests of...

Author(s): Rupert Seidl, Daniel C. Donato, Kenneth F. Raffa, Monica G. Turner
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Average stand age from forest inventory plots does not describe historical fire regimes in ponderosa pine and mixed-conifer forests of western North America

www.nrfirescience.org/resource/14438

Quantifying historical fire regimes provides important information for managing contemporary forests. Historical fire frequency and severity can be estimated using several methods; each method has strengths and weaknesses and presents challenges for interpretation and verification. Recent efforts to quantify the timing of historical...

Year Published: 2016
Type: Document
Book or Chapter or Journal Article

A guide to fuels management in riparian areas of the Interior West

www.nrfirescience.org/resource/12632

Fuel treatments in riparian areas pose distinct challenges. Riparian areas are protected by administrative regulations, many of which are largely custodial and restrict active management. However, riparian areas have also been affected by fire suppression, land use, and disturbance and manipulative treatments of fuels...

Author(s): Kathleen A. Dwire, Kristen E. Meyer, Sandra E. Ryan, Gregg M. Riegel, Timothy A. Burton
Year Published: 2016
Type: Document
Synthesis, Technical Report or White Paper
Interactions among spruce beetle disturbance, climate change and forest dynamics captured by a forest landscape model
www.nrfirescience.org/resource/13909
The risk of bark beetle outbreaks is widely predicted to increase because of a warming climate that accelerates temperature-driven beetle population growth and drought stress that impairs host tree defenses. However, few if any studies have explicitly evaluated climatically enhanced beetle population dynamics in relation to climate-...
Author(s): Christian Temperli, Thomas T. Veblen, Sarah Hart, Dominik Kulakowski, Alan J. Tepley
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Effects of tree cutting and fire on understory vegetation in mixed conifer forests
www.nrfirescience.org/resource/12896
Mixed conifer forests of western North America are challenging for fire management, as historical fire regimes were highly variable in severity, timing, and spatial extent. Complex fire histories combined with site factors and other disturbances, such insect outbreaks, led to great variation in understory plant communities, and...
Author(s): Scott R. Abella, Judith D. Springer
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Prioritization of forest restoration projects: tradeoffs between wildfire protection, ecological restoration, and economic objectives
www.nrfirescience.org/resource/13729
The implementation of US federal forest restoration programs on national forests is a complex process that requires balancing diverse socioecological goals with project economics. Despite both the large geographic scope and substantial investments in restoration projects, a quantitative decision support framework to locate optimal...
Author(s): Kevin C. Vogler, Alan A. Ager, Michelle A. Day, Michael Jennings, John D. Bailey
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Climate, snowpack, and streamflow of Priest River Experimental Forest, revisited
www.nrfirescience.org/resource/13114
The climate record of Priest River Experimental Forest has the potential to provide a century-long history of northern Rocky Mountain forest ecosystems. The record, which began in 1911 with the Benton Flat Nursery control weather station, included observations of temperature, precipitation, humidity, and wind. Later, other...
Author(s): Wade T. Tinkham, Robert Denner, Russell T. Graham
Year Published: 2015
Type: Document
Technical Report or White Paper

Post-wildfire debris flows in southern British Columbia, Canada
www.nrfirescience.org/resource/12886
Several post-wildfire debris flows and other landslides occurred after the extreme wildfire season of 2003 in the southern interior of British Columbia. Such events had not been previously reported in Canada, although they are common in lower latitudes. Severe wildfire seasons also were experienced
Historical spatial patterns and contemporary tree mortality in dry mixed-conifer forests
www.nrfirescience.org/resource/13649
Management and restoration of the dry, frequent-fire forests of the North American west depend on sound information about both historical and contemporary conditions to adequately address repercussions of fire suppression and changing climate. The purpose of this study is to quantify historical tree spatial patterns and assess...
Author(s): Kate A. Clyatt, Justin S. Crotteau, Michael S. Schaedel, Haley L. Wiggins, Harold Kelley, Derek J. Churchill, Andrew J. Larson
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

A state-and-transition simulation modeling approach for estimating the historical range of variability
www.nrfirescience.org/resource/13078
Reference ecological conditions offer important context for land managers as they assess the condition of their landscapes and provide benchmarks for desired future conditions. State-and-transition simulation models (STSMs) are commonly used to estimate reference conditions that can be used to evaluate current ecosystem conditions...
Author(s): Kori Blankenship, Leonardo Frid, James L. Smith
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Long-term effects on distribution of forest biomass following different harvesting levels in the Northern Rocky Mountains
www.nrfirescience.org/resource/13625
With increasing public demand for more intensive biomass utilization from forests, the concerns over adverse impacts on productivity by nutrient depletion are increasing. We remeasured the 1974 site of the Forest Residues Utilization Research and Development in northwestern Montana to investigate long-term impacts of intensive...
Author(s): Woongsoon Jang, Christopher R. Keyes, Deborah S. Page-Dumroese
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Impacts of fire on snowshoe hares in Glacier National Park, Montana, USA
www.nrfirescience.org/resource/13460
Forest fires fundamentally shape the habitats available for wildlife. Current predictions for fire under a warming climate suggest larger and more severe fires may occur, thus challenging scientists and managers to understand and predict impacts of fire on focal species, especially species of management concern. Snowshoe hares (...
Author(s): Ellen Cheng, Karen E. Hodges, Scott Mills
Year Published: 2015
Type: Document
Short-interval disturbance in lodgepole pine forests, British Columbia, Canada: understory and overstory response to mountain pine beetle and fire

The recent mountain pine beetle (MPB) outbreak across western North America's interior lodgepole pine forests has altered the landscape such that the majority of wildfires in the region will now burn through MPB-affected stands. Study of plant community response to these combined disturbances is critical for our understanding and...

Author(s): Marc Edwards, Meg A. Krawchuk, Philip J. Burton
Year Published: 2015
Type: Document

Low-severity fire increases tree defense against bark beetle attacks

Induced defense is a common plant strategy in response to herbivory. Although abiotic damage, such as physical wounding, pruning, and heating, can induce plant defense, the effect of such damage by large-scale abiotic disturbances on induced defenses has not been explored and could have important consequences for plant survival...

Author(s): Sharon M. Hood, Anna Sala, Emily K. Heyerdahl, Marion Boutin
Year Published: 2015
Type: Document

Mixed severity fire effects within the Rim fire: relative importance of local climate, fire weather, topography, and forest structure

Recent and projected increases in the frequency and severity of large wildfires in the western U.S. makes understanding the factors that strongly affect landscape fire patterns a management priority for optimizing treatment location. We compared the influence of variations in the local environment on burn severity patterns on the...

Author(s): Van R. Kane, C. Alina Cansler, Nicholas A. Povak, Jonathan T. Kane, Bob McGaughey, James A. Lutz, Derek J. Churchill, Malcolm P. North
Year Published: 2015
Type: Document

Are high-severity fires burning at much higher rates recently than historically in dry-forest landscapes of the western USA?

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
A case study comparison of LANDFIRE fuel loading and emissions on a mixed conifer forest in northern Idaho, USA

www.nrfirescience.org/resource/13750

The use of fire as a land management tool is well recognized for its ecological benefits in many natural systems. To continue to use fire while complying with air quality regulations, land managers are often tasked with modeling emissions from fire during the planning process. To populate such models, the Landscape Fire...

Author(s): Joshua C. Hyde, Eva K. Strand, Andrew T. Hudak, Dale Hamilton
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Temporal fuel dynamics following high-severity fire in dry mixed conifer forests of the eastern Cascades, Oregon, USA

www.nrfirescience.org/resource/12889

Fire-resilient landscapes require the recurrent use of fire, but successful use of fire in previously burned areas must account for temporal fuel dynamics. We analysed factors influencing temporal fuel dynamics across a 24-year spatial chronosequence of unmanipulated dry mixed conifer forests following high-severity fire. Duff and...

Author(s): Christopher J. Dunn, John D. Bailey
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Increasing weight of evidence that thinning and burning treatments help restore understory plant communities in ponderosa pine forests

www.nrfirescience.org/resource/13692

For more than a century ecosystems around the world have experienced an increase in the dominance of woody species. While the drivers of woody plant proliferation are complex, interactions between climate and land-use change are commonly invoked as primary contributing factors. In ponderosa pine forests of western North America,...

Author(s): Robert T. Strahan, Michael T. Stoddard, Judith D. Springer, David W. Huffman
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Assessing soil and vegetation recovery following the 2005 School Fire, Umatilla National Forest - 10-year update

www.nrfirescience.org/resource/12811

Following the 2005 School Fire which burned ~ 50,000 acres across forest and grasslands, managers were particularly concerned with treating severely burned areas to mitigate weed spread and to limit soil erosion. Various mulching treatments (wheat straw, wood strand, and hydromulch) were implemented to control...

Author(s): Peter R. Robichaud, Penelope Morgan, Leigh B. Lentile, Sarah A. Lewis, Andrew T. Hudak, Deborah S. Page-Dumroese
Year Published: 2015
Type: Document
Research Brief or Fact Sheet

Collaborative fuels reduction and restoration - Experiences from the Southwestern Crown of the Continent
Forests that historically burned in mixed-severity fire regimes prove difficult to manage, especially when they border homes and prized recreation areas. This management challenge was the focus of the Fuels Reduction and Restoration in Mixed-Conifer Forests of the Southwestern Crown of the Continent field trip, following the May...

Author(s): Corey L. Gucker
Year Published: 2015
Type: Document
Research Brief or Fact Sheet

Fire legacies impact conifer regeneration across environmental gradients in the U.S. northern Rockies

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 examined...

Author(s): Kerry Kemp, Philip E. Higuera, Penelope Morgan
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Vegetation response to burn severity, native grass seeding, and salvage logging

As the size and extent of wildfires has increased in recent decades, so has the cost and extent of post-fire management, including seeding and salvage logging. However, we know little about how burn severity, salvage logging, and post-fire seeding interact to influence vegetation recovery long-term. We sampled understory plant...

Author(s): Penelope Morgan, Marshell Moy, Christine A. Droske, Leigh B. Lentile, Sarah A. Lewis, Peter R. Robichaud, Andrew T. Hudak, Christopher Jason Williams
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Northern Rockies pyrogeography: an example of fire atlas utility

We demonstrated the utility of digital fire atlases by analyzing forest fire extent across cold, dry, and mesic forests, within and outside federally designated wilderness areas during three different fire management periods: 1900 to 1934, 1935 to 1973, and 1974 to 2008. We updated an existing atlas with a 12,070,086 ha recording...

Author(s): Penelope Morgan, Emily K. Heyerdahl, Carol Miller, Aaron M. Wilson, Carly E. Gibson
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Challenges and opportunities for large landscape-scale management in a shifting climate: the importance of nested adaptation responses across geospatial and temporal scales

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-
A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: monitoring

www.nrfirescience.org/resource/12920

Short- and medium-term evaluation of how fuel treatments are working is the only way to know if the hundreds of activities on the ground are adding up to the goals of more resilient landscapes and increased safety of people and property. Monitoring is a critical resource for decision makers who design fuels management programs,...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

The temporal evolution of wildfire ash and implications for post-fire infiltration

www.nrfirescience.org/resource/12966

Changes in the properties of an ash layer with time may affect the amount of post-fire runoff, particularly by the formation of ash surface crusts. The formation of depositional crusts by ash have been observed at the pore and plot scales, but the causes and temporal evolution of ash layers and associated crusts have not yet been...

Author(s): Victoria N. Balfour, Stefan H. Doerr, Peter R. Robichaud
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

High-severity fire corroborated in historical dry forests of the western United States: response to Fule et al.

www.nrfirescience.org/resource/13490

Accurate assessment of changing fire regimes is important, since climatic change and people may be promoting more wildfires. Government wildland fire policies and restoration programmes in dry western US forests are based on the hypothesis that high-severity fire was rare in historical fire regimes, modern fire severity is...

Author(s): Mark A. Williams, William L. Baker
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: mechanical, chemical, and biological fuel treatment methods

www.nrfirescience.org/resource/12918

Several mechanical approaches to managing vegetation fuels hold promise when applied to the dry mixed conifer forests in the western United States. These are most useful to treat surface, ladder, and crown fuels. There are a variety of techniques to remove or alter all kinds of plant biomass (live, dead, or decomposed) that affect...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Future Forests Webinar Series, webinar proceedings and summary: ongoing research and management responses to the mountain pine beetle outbreak
www.nrfirescience.org/resource/12963
The Future Forest Webinar Series facilitated dialogue between scientists and managers about the challenges and opportunities created by the mountain pine beetle (MPB) epidemic. The series consisted of six webinar facilitated by the USFS Rocky Mountain Research Station, the Northern and Rocky Mountain Regions, and the Colorado Forest...

Integrating satellite imagery with simulation modeling to improve burn severity mapping
www.nrfirescience.org/resource/12957
Both satellite imagery and spatial fire effects models are valuable tools for generating burn severity maps that are useful to fire scientists and resource managers. The purpose of this study was to test a new mapping approach that integrates imagery and modeling to create more accurate burn severity maps. We developed and assessed...
Author(s): Eva C. Karau, Pamela G. Sikkink, Robert E. Keane, Gregory K. Dillon

Previous fires moderate burn severity of subsequent wildland fires in two large western US wilderness areas
www.nrfirescience.org/resource/12051
Wildland fire is an important natural process in many ecosystems. However, fire exclusion has reduced frequency of fire and area burned in many dry forest types, which may affect vegetation structure and composition, and potential fire behavior. In forests of the western U.S., these effects pose a challenge for fire and land...
Author(s): Sean A. Parks, Carol Miller, Cara R. Nelson, Zachary A. Holden

Characterizing spatial reference conditions in southwestern warm/dry mixed-conifer forests
www.nrfirescience.org/resource/12951
Reference conditions describe attributes of ecosystem structure, composition, and function and are used to inform ecological restoration efforts. Reference condition information on tree spatial patterns that occurred prior to wide-spread fire exclusion is limited for warm/dry mixed-conifer forests of the western U.S., particularly...
Author(s): Kyle Rodman, Andrew Sanchez Meador

Fire behavior in masticated fuels: a review
Mastication is an increasingly common fuels treatment that redistributes 'ladder' fuels to the forest floor to reduce vertical fuel continuity, crown fire potential, and fireline intensity, but fuel models do not exist for predicting fire behavior in these fuel types. Recent fires burning in masticated fuels have behaved in...

Author(s): Jesse K. Kreye, Nolan W. Brewer, Penelope Morgan, J. Morgan Varner, Alistair M. S. Smith, Chad M. Hoffman, Roger D. Ottmar
Year Published: 2014
Type: Document
Book or Chapter or Journal Article, Synthesis

Is proportion burned severely related to daily area burned?

The ecological effects of forest fires burning with high severity are long-lived and have the greatest impact on vegetation successional trajectories, as compared to low-to-moderate severity fires. The primary drivers of high severity fire are unclear, but it has been hypothesized that wind-driven, large fire-growth days play a...

Author(s): Donovan Birch, Penelope Morgan, Crystal A. Kolden, Andrew T. Hudak, Alistair M. S. Smith
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

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

Fuels treatments in ponderosa pine - Visits to the Boise National Forest and Boise Basin Exp. Forest

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

Contrasting effects of wildfire and ecological restoration in old-growth western larch forests

The scientific basis for restoration of fire-excluded western larch/mixed-conifer forests is not as well developed as that for dry fire-frequent forests. We compared the effects of wildfire and restoration (combined thinning and prescribed fire) in fire-excluded western larch forests. In 2012, the wildfire site
The ecological importance of severe fire - Site visits to Lolo Creek and Blue Mountain burned areas
www.nrfirescience.org/resource/12652
Dr. Dick Hutto, professor of Organismal Biology and Ecology at the University of Montana, took participants of the May 2014 Large Wildland Fires Conference to recently burned sites to discuss fire effects. Hutto was enthused and excited about “the magical biology” occurring on recently burned sites. Magical biology includes...
Author(s): Corey L. Gucker
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Stand density and age affect tree-level structural and functional characteristics of young, postfire lodgepole pine in Yellowstone National Park
www.nrfirescience.org/resource/12925
More frequent fire activity associated with climate warming is expected to increase the extent of young forest stands in fire-prone landscapes, yet growth rates and biomass allocation patterns in young forests that regenerated naturally following stand-replacing fire have not been well studied. We assessed the structural and...
Author(s): Paige E. Copenhaver, Daniel B. Tinker
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Relative effects of climate change and wildfires on stream temperatures: a simulation modeling approach in a Rocky Mountain watershed
www.nrfirescience.org/resource/12998
Freshwater ecosystems are warming globally from the direct effects of climate change on air temperature and hydrology and the indirect effects on near-stream vegetation. In fire-prone landscapes, vegetative change may be especially rapid and cause significant local stream temperature increases but the importance of these increases...
Author(s): Lisa M. Holsinger, Robert E. Keane, Daniel J. Isaak, Lisa A. Eby, Michael K. Young
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Interactions among the mountain pine beetle, fires, and fuels
www.nrfirescience.org/resource/12022
Bark beetle outbreaks and wildfires are principal drivers of change in western North American forests, and both have increased in severity and extent in recent years. These two agents of disturbance interact in complex ways to shape forest structure and composition. For example, mountain pine beetle, Dendroctonus ponderosae Hopkins...
Author(s): Michael J. Jenkins, Justin B. Runyon, Christopher J. Fettig, Wesley G. Page, Barbara J. Bentz
Year Published: 2014
Implementing fuel treatments in every place where it could be beneficial to do so is impractical and not cost effective under any plausible specification of objectives. Only some of the many possible kinds of treatments will be effective in any particular stand and there are some stands that seem to defy effective treatment. In many...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Tables have been constructed for use in making quick estimates of canopy base height, canopy fuel load, and canopy bulk density from visual observations or field measurements of stand height, basal area, and stand density for pure stands of ponderosa pine (Pinus ponderosa Dougl. ex Laws.), lodgepole pine (Pinus contorta Dougl. ex...  
Author(s): Martin E. Alexander, Miguel G. Cruz
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Fire has had a profound historical role in shaping dry mixed conifer forests in the western United States. However, the uncertainty and complexity of prescribed fires raises the question “Is fire always the best option for treating fuels?” The decision to use prescribed fire is dependent upon several factors.  
Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Recent work has demonstrated that evolutionary processes shape ecological dynamics on relatively short timescales (eco-evolutionary dynamics), but demonstrating these effects at large spatial scales in natural landscapes has proven difficult. We used empirical studies and modeling to investigate how selective pressures from fire and...  
Author(s): Matt V. Talluto, Craig W. Benkman
Year Published: 2014
Type: Document
Examining historical and current mixed-severity fire regimes in ponderosa pine and mixed-conifer forests of western north America
www.nrfirescience.org/resource/12904
There is widespread concern that fire exclusion has led to an unprecedented threat of uncharacteristically severe fires in ponderosa pine (Pinus ponderosa Dougl. ex. Laws) and mixed-conifer forests of western North America. These extensive montane forests are considered to be adapted to a low/moderate-severity fire regime that...
Author(s): Dennis C. Odion, Chad T. Hanson, Andre Arsenault, William L. Baker, Dominick A. DellaSala, Richard L. Hutto, Walt Klenner, Max A. Moritz, Rosemary L. Sherriff, Thomas T. Veblen, Mark A. Williams
Year Published: 2014
Type: Document

De-coupling seasonal changes in water content and dry matter to predict live conifer foliar moisture content
www.nrfirescience.org/resource/12959
Live foliar moisture content (LFMC) significantly influences wildland fire behaviour. However, characterising variations in LFMC is difficult because both foliar mass and dry mass can change throughout the season. Here we quantify the seasonal changes in both plant water status and dry matter partitioning. We collected new and old...
Author(s): William Matt Jolly, Ann M. Hadlow, Kathleen Huguet
Year Published: 2014
Type: Document

Understanding evacuation preferences and wildfire mitigations among northwest Montana residents
www.nrfirescience.org/resource/12955
There is currently insufficient information in the United States about residents' planned evacuation actions during wildfire events, including any intent to remain at or near home during fire events. This is incompatible with growing evidence that select populations at risk from wildfire are considering alternatives to evacuation....
Author(s): Travis B. Paveglio, Tony Prato, Douglas Dalenberg, Tyron J. Venn
Year Published: 2014
Type: Document

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
Western spruce budworm outbreaks did not increase fire risk over the last three centuries: a dendrochronological analysis of inter-disturbance synergism

www.nrfirescience.org/resource/13637

Insect outbreaks are often assumed to increase the severity or probability of fire occurrence through increased fuel availability, while fires may in turn alter susceptibility of forests to subsequent insect outbreaks through changes in the spatial distribution of suitable host trees. However, little is actually known about the...

Author(s): Aquila Flower, Daniel G. Gavin, Emily K. Heyerdahl, Russell A. Parsons, Greg M. Cohn
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Resin duct size and density as ecophysiological traits in fire scars of Pseudotsuga menziesii and Larix occidentalis

www.nrfirescience.org/resource/13015

Background and Aims: Resin ducts (RDs) are features present in most conifer species as defence structures against pests and pathogens; however, little is known about RD expression in trees following fire injury. This study investigates changes in RD size and density in fire scars of Douglas fir (Pseudotsuga menziesii) and western...

Author(s): Estelle Arbellay, Markus Stoffel, Elaine Kennedy Sutherland, Kevin T. Smith, Donald A. Falk
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

Crown fire potential in lodgepole pine forests during the red stage of mountain pine beetle attack

www.nrfirescience.org/resource/12926

Mountain pine beetle (MPB) outbreaks within the previous 10-15 years have affected millions of hectares of lodgepole pine forests in western North America. Concerns about the influence of recent tree mortality on changes in fire behaviour amongst firefighters and fire managers have led researchers to attempt to quantify the effects...

Author(s): Wesley G. Page, Michael J. Jenkins, Martin E. Alexander
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Management for mountain pine beetle outbreak suppression: does relevant science support current policy?
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

Spectroscopic analysis of seasonal changes in live fuel moisture content and leaf dry mass

Live fuel moisture content (LFMC), the ratio of water mass to dry mass contained in live plant material, is an important fuel property for determining fire danger and for modeling fire behavior. Remote sensing estimation of LFMC often relies on an assumption of changing water and stable dry mass over time. Fundamental understanding...

Author(s): Yi Qi, Philip E. Dennison, William Matt Jolly, Rachel C. Kropp, Simon C. Brewer
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Estimating critical climate-driven thresholds in landscape dynamics using spatial simulation modeling: climate change tipping points in fire management - Final Report to the Joint Fire Science Program

Climate projections for the next 20-50 years forecast higher temperatures and variable precipitation for many landscapes in the western United States. Climate changes may cause or contribute to threshold shifts, or tipping points, where relatively small shifts in climate result in large, abrupt, and persistent changes in landscape...

Author(s): Robert E. Keane, Rachel A. Loehman
Year Published: 2013
Type: Document
Technical Report or White Paper

Goodyera repens (northern rattlesnake plantain)

This FEIS species review synthesizes information on the relationship of Goodyera repens (northern rattlesnake plantain) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Ilana L. Abrahamson
Year Published: 2013
Type: Document
Synthesis

Wildfire and fuel treatment effects on forest carbon dynamics in the western United States

Sequestration of carbon (C) in forests has the potential to mitigate the effects of climate change by offsetting future emissions of greenhouse gases. However, in dry temperate forests, wildfire is a natural disturbance agent with the potential to release large fluxes of C into the atmosphere. Climate-driven increases in wildfire...
Latent resilience in ponderosa pine forest: effects of resumed frequent fire
www.nrfirescience.org/resource/12018
Ecological systems often exhibit resilient states that are maintained through negative feedbacks. In ponderosa pine forests, fire historically represented the negative feedback mechanism that maintained ecosystem resilience; fire exclusion reduced that resilience, predisposing the transition to an alternative ecosystem state upon...

Author(s): Andrew J. Larson, R. Travis Belote, C. Alina Cansler, Sean A. Parks, Matthew S. Dietz
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Accipiter gentilis (northern goshawk)
www.nrfirescience.org/resource/10662
This FEIS species review synthesizes information on the relationship of Accipiter gentilis (northern goshawk) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Katharine R. Stone
Year Published: 2013
Type: Document
Synthesis

Characterizing wildfire hazard and risk in mountain pine beetle-affected stands and how to identify those characteristics at the landscape-scale
www.nrfirescience.org/resource/11977
The transformation of fuels resulting from the mountain pine beetle epidemic is unprecedented in its large geographic extent and the rapid pace of the transformation. This paper describes a proposed fire risk and hazard characterization system, as well as methodology for locating certain stand types on the landscape.

Author(s): Robert W. Gray
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Appendix 3: Response of western mountain ecosystems to climatic variability and change: a synthesis from the Western Mountain Initiative
www.nrfirescience.org/resource/11904
The Western Mountain Initiative (WMI), a consortium of research groups in the Western United States, focuses on understanding and predicting responses—especially sensitivities, thresholds, resistance, and resilience—of mountain ecosystems to climatic variability and change (Peterson et al. 2012). The WMI addresses how climatic...

Author(s): Crystal L. Raymond
Year Published: 2013
Type: Document
Synthesis, Technical Report or White Paper
Interactive effects of wildfire, forest management, and isolation on amphibian and parasite abundance

Projected increases in wildfire and other climate-driven disturbances will affect populations and communities worldwide, including host-parasite relationships. Research in temperate forests has shown that wildfire can negatively affect amphibians, but this research has occurred primarily outside of managed landscapes where...

Author(s): Blake R. Hossack, Winsor H. Lowe, R. Ken Honeycutt, Sean A. Parks, Paul S. Corn
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Combustion efficiency and emission factors for wildfire-season fires in mixed conifer forests of the northern Rocky Mountains, US

In the US, wildfires and prescribed burning present significant challenges to air regulatory agencies attempting to achieve and maintain compliance with air quality regulations. Fire emission factors (EF) are essential input for the emission models used to develop wildland fire emission inventories. Most previous studies quantifying...

Author(s): Shawn P. Urbanski
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Appendix 1: Regional summaries - Great Plains

Natural vegetation of the Great Plains is primarily grassland and shrubland ecosystems with trees occurring in scattered areas along streams and rivers, on planted woodlots, as isolated forests such as the Black Hills of South Dakota, and near the biogeographic contact with Rocky Mountains and eastern deciduous forests. Trees are...

Author(s): Linda A. Joyce
Year Published: 2013
Type: Document
Synthesis, Technical Report or White Paper

Bark beetle effects on fuel profiles across a range of stand structures in Douglas-fir forests of Greater Yellowstone

Consequences of bark beetle outbreaks for forest wildfire potential are receiving heightened attention, but little research has considered ecosystems with mixed-severity fire regimes. Such forests are widespread, variable in stand structure, and often fuel limited, suggesting that beetle outbreaks could substantially alter fire...

Author(s): Daniel C. Donato, Brian J. Harvey, William H. Romme, Martin Simard, Monica G. Turner
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

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

www.nrfirescience.org/resource/13478
A goal of fire management in wilderness is to allow fire to play its natural ecological role without intervention. Unfortunately, most unplanned ignitions in wilderness are suppressed, in part because of the risk they might pose to values outside of the wilderness. Although the fire management community has embraced the concept of...

Author(s): Kevin M. Barnett
Year Published: 2013
Type: Document
Dissertation or Thesis

Aboriginal precedent for active management of sagebrush-perennial grass communities in the Great Basin
www.nrfirescience.org/resource/12146
Until recently, most contemporary ecologists have ignored or diminished anecdotal historical accounts and anthropologists' reports about aboriginal fire in the Great Basin. Literature review shows that Indians practiced regular use of fire for many purposes, including the obvious reasons of increasing the availability of desired...

Author(s): Kent J. McAdoo, Brad W. Schultz, Sherman R. Swanson
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Comparing three sampling techniques for estimating fine woody down dead biomass
www.nrfirescience.org/resource/12038
Designing woody fuel sampling methods that quickly, accurately and efficiently assess biomass at relevant spatial scales requires extensive knowledge of each sampling method's strengths, weaknesses and tradeoffs. In this study, we compared various modifications of three common sampling methods (planar intercept, fixed-area microplot...)

Author(s): Robert E. Keane, Kathy L. Gray
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Post-fire mulching for runoff and erosion mitigation; Part I: effectiveness at reducing hillslope erosion rates
www.nrfirescience.org/resource/11994
Mulch treatments often are used to mitigate post-fire increases in runoff and erosion rates but the comparative effectiveness of various mulches is not well established. The ability of mulch treatments to reduce sediment yields from natural rainfall and resulting overland flow was measured using hillslope plots on areas burned at...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Joseph W. Wagenbrenner, Louise E. Ashmun, Robert E. Brown
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Developing a computerized approach for optimizing individual tree removal to efficiently reduce crown fire potential
www.nrfirescience.org/resource/11889
Thinning is a common silvicultural treatment being widely used to restore different types of overstocked forest stands in western U.S. because of its effect on changing fire behavior. Typically, thinning is applied at the stand level using prescriptions derived from sample plots that ignore variability in tree
Surface fire intensity influences simulated crown fire behavior in lodgepole pine forests with recent mountain pine beetle-caused tree mortality

www.nrfirescience.org/resource/12138

Recent bark beetle outbreaks have had a significant impact on forests throughout western North America and have generated concerns about interactions and feedbacks between beetle attacks and fire. However, research has been hindered by a lack of experimental studies and the use of fire behavior models incapable of accounting for the...

Author(s): Chad M. Hoffman, Penelope Morgan, William E. Mell, Russell A. Parsons, Eva K. Strand, Stephen Cook
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Reduced ectoparasite loads of deer mice in burned forest: from fleas to trees?

www.nrfirescience.org/resource/12030

We tested whether reduced parasite loads might contribute to high post-fire abundances of deer mice (Peromyscus maniculatus). We performed parasite examinations of 54 mice captured in burned forest in the area of Davis Fire (western Montana, USA), and 26 mice captured in nearby unburned forest. Mean abundance of ectoparasites (fleas...)

Author(s): Rafal Zwolak, S. Meagher, J. W. Vaughn, S. Dziemian, Elizabeth E. Crone
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

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

www.nrfirescience.org/resource/13431

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

Restoring forest resilience: from reference spatial patterns to silvicultural prescriptions and monitoring

www.nrfirescience.org/resource/14006

Stand-level spatial pattern influences key aspects of resilience and ecosystem function such as disturbance behavior, regeneration, snow retention, and habitat quality in frequent-fire pine and mixed-conifer forests. Reference sites, from both pre-settlement era reconstructions and contemporary forests with active fire regimes,...

Author(s): Derek J. Churchill, Andrew J. Larson, Matthew C. Dahlgreen, Jerry F. Franklin, Paul F. Hessburg, James A. Lutz
Landscape-scale eco-evolutionary dynamics: selection by seed predators and fire determine a major reproductive strategy
www.nrfirescience.org/resource/11982
Recent work in model systems has demonstrated significant effects of rapid evolutionary change on ecological processes (eco-evolutionary dynamics). Fewer studies have addressed whether eco-evolutionary dynamics structure natural ecosystems. We investigated variation in the frequency of serotiny in lodgepole pine (Pinus contorta), a...
Author(s): Matt V. Talluto, Craig W. Benkman
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Fire and nitrogen effects on purple threeawn (Aristida purpurea) abundance in northern mixed-grass prairie old fields
www.nrfirescience.org/resource/12019
Purple threeawn (Aristida purpurea Nutt. varieties) is a native grass capable of increasing on rangelands, forming near monocultures, and creating a stable state. Productive rangelands throughout the Great Plains and Intermountain West have experienced increases in purple threeawn abundance, reducing overall forage quality. Our...
Author(s): Dustin J. Strong, Lance T. Vermeire, Amy C. Ganguli
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

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

Duff mound consumption and cambium injury for centuries-old western larch from prescribed burning in western Montana
www.nrfirescience.org/resource/11974
Western larch is one of the most fire-adapted conifers in western North America. Its historical perpetuation depended upon regular fire disturbances, which creates open stand conditions and mineral seedbeds. A stand of 200- to 500-year-old larch in western Montana with deep duff mounds resulting from an unusually long 150-year fire-...
Author(s): Michael G. Harrington
Year Published: 2013
Type: Document
Book or Chapter or Journal Article
Modelling conditional burn probability patterns for large wildland fires
www.nrfirescience.org/resource/12005
We present a technique for modelling conditional burn probability patterns in two dimensions for large wildland fires. The intended use for the model is strategic program planning when information about future fire weather and event durations is unavailable and estimates of the average probabilistic shape and extent of large fires...
Author(s): Pamela S. Ziesler, Douglas B. Rideout, Robin Reich
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Appendix 2: Risk-based framework and risk case studies. Risk assessment for wildfire in the Western United States
www.nrfirescience.org/resource/11903
Wildfire is one of the two most significant disturbance agents (the other being insects) in forest ecosystems of the Western United States, and in a warmer climate, will drive changes in forest composition, structure, and function (Dale et al. 2001, McKenzie et al. 2004). Although wildfire is highly stochastic in space and time,...
Author(s): David L. Peterson, Jeremy S. Littell
Year Published: 2013
Type: Document
Technical Report or White Paper

Fire effects on basal area, tiller production, and mortality of the C4 bunchgrass, purple threeawn
www.nrfirescience.org/resource/12045
Fire behavior associated with wild and prescribed fires is variable, but plays a vital role in how a plant responds to fire. Understanding the relationship between fire behavior and rangeland plant community response will help to improve the use of prescribed fire to achieve management objectives. Fire is an important ecological...
Author(s): Dustin J. Strong, Amy C. Ganguli, Lance T. Vermeire
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Bridging natural resource communication boundaries: public perceptions of smoke from wildland fires and forest managers’ perspectives of climate change science
www.nrfirescience.org/resource/13479
Land managers of the northern Rocky Mountains and south-central U.S. are challenged with numerous social and ecological changes, many of which are linked to climate change. The work presented here focuses on two important research gaps: 1) managers do not understand public opinions toward smoke from prescribed fires (a necessary...
Author(s): Jarod Blades
Year Published: 2013
Type: Document
Dissertation or Thesis

Appendix 1: Regional summaries - Northwest
www.nrfirescience.org/resource/11901
The state of knowledge about climatic effects on forests of the Northwest region was recently
summarized in a peer reviewed assessment of these effects in Washington (Littell et al. 2009, 2010) and a white paper on climatic effects on Oregon vegetation (Schafer et al. 2010). Recent PNW and West-wide modeling studies provide...

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

[www.nrfirescience.org/resource/13476](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...

**Wilderness shapes contemporary fire size distributions across landscapes of the western United States**

[www.nrfirescience.org/resource/12682](www.nrfirescience.org/resource/12682)

In many U.S. federally designated wilderness areas, wildfires are likely to burn of their own accord due to favorable management policies and remote location. Previous research suggested that limitations on fire size can result from the evolution of natural fire regimes, specifically in places where fuels were...

**Managing high-elevation sagebrush steppe: do conifer encroachment and prescribed fire affect habitat for pygmy rabbits?**

[www.nrfirescience.org/resource/11999](www.nrfirescience.org/resource/11999)

Both fire and conifer encroachment can markedly alter big sagebrush communities and thus habitat quality and quantity for wildlife. We investigated how conifer encroachment and spring prescribed burning affected forage and cover resources for a sagebrush specialist, the pygmy rabbit. We studied these dynamics at spring prescribed...

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

[www.nrfirescience.org/resource/12142](www.nrfirescience.org/resource/12142)

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...
Influence of recent bark beetle outbreak on fire severity and postfire tree regeneration in montane Douglas-fir forests
www.nrfirescience.org/resource/12029
Understanding how disturbances interact to shape ecosystems is a key challenge in ecology. In forests of western North America, the degree to which recent bark beetle outbreaks and subsequent fires may be linked (e.g., outbreak severity affects fire severity) and/or whether these two disturbances produce compound effects on postfire...
Author(s): Brian J. Harvey, Daniel C. Donato, William H. Romme, Monica G. Turner
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Evaluating regression model estimates of canopy fuel stratum characteristics in four crown fire-prone fuel types in western North America
www.nrfirescience.org/resource/8312
Two evaluations were undertaken of the regression equations developed by M. Cruz, M. Alexander and R. Wakimoto (2003, International Journal of Wildland Fire 12, 39-50) for estimating canopy fuel stratum characteristics from stand structure variables for four broad coniferous forest fuel types found in western North America. The...
Author(s): Miguel G. Cruz, Martin E. Alexander
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Bark beetle outbreaks, wildfires and defensible space: how much area do we need to treat to protect homes and communities?
www.nrfirescience.org/resource/8340
Extensive beetle outbreaks across western North American forests have spurred debates about how to best protect communities from wildfire. Previous work has found that fuels in the wildland-urban interface and especially in the defensible space (40-m radius) around structures are the most important determinants of the flammability...
Author(s): Glen Aronson, Dominik Kulakowski, Glen Aronson, Dominik Kulakowski
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

A review of logistic regression models used to predict post-fire tree mortality of western North American conifers
www.nrfirescience.org/resource/8303
Logistic regression models used to predict tree mortality are critical to post-fire management, planning prescribed burns and understanding disturbance ecology. We review literature concerning post-fire mortality prediction using logistic regression models for coniferous tree species in the western USA. We include synthesis and...
Author(s): Travis J. Woolley, David C. Shaw, Lisa Ganio, Stephen A. Fitzgerald
Year Published: 2012
Type: Document
Book or Chapter or Journal Article, Synthesis
Effects of ungulate herbivory on aspen, cottonwood, and willow development under forest fuels treatment regimes

Herbivory by domestic and wild ungulates can dramatically affect vegetation structure, composition and dynamics in nearly every terrestrial ecosystem of the world. These effects are of particular concern in forests of western North America, where intensive herbivory by native and domestic ungulates has the potential to substantially...

Author(s): Bryan A. Endress, Michael J. Wisdom, Martin Vavra, Catherine G. Parks, Brian L. Dick, Bridgett J. Naylor, Jennifer M. Boyd
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States

This guide describes the benefits, opportunities, and trade-offs concerning fuel treatments in the dry mixed conifer forests of northern California and the Klamath Mountains, Pacific Northwest Interior, northern and central Rocky Mountains, and Utah. Multiple interacting disturbances and diverse physical settings have created a...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Year Published: 2012
Type: Document
Synthesis, Technical Report or White Paper

The effects of forest fuel-reduction treatments in the United States

The current conditions of many seasonally dry forests in the western and southern United States, especially those that once experienced low- to moderate-intensity fire regimes, leave them uncharacteristically susceptible to high-severity wildfire. Both prescribed fire and its mechanical surrogates are generally successful in meeting...

Author(s): Scott L. Stephens, James D. McIver, Ralph E. Boerner, Christopher J. Fettig, Joseph B. Fontaine, Bruce R. Hartsough, Patricia L. Kennedy, Dylan W. Schwilk
Year Published: 2012
Type: Document
Book or Chapter or Journal Article, Synthesis

Wildfire provides refuge from local extinction but is an unlikely driver of outbreaks by mountain pine beetle

Bark beetle outbreaks and wildfire are important disturbances in conifer ecosystems, yet their interactions are not well understood. We evaluated whether fire injury increased susceptibility of lodgepole pines (Pinus contorta) to mountain pine beetle (Dendroctonus ponderosae Hopkins), how it influenced beetle reproductive success....

Author(s): Erinn N. Powell, Philip A. Townsend, Kenneth F. Raffa
Year Published: 2012
Type: Document
Book or Chapter or Journal Article
Effects of spring prescribed burning and wildfires on watershed nitrogen dynamics of central Idaho headwater areas
www.nrfirescience.org/resource/8294
Fire is known for its potential to profoundly affect nitrogen (N) dynamics in both terrestrial and aquatic ecosystems. However, few studies have investigated fire effects on several important watershed N pools simultaneously or have directly compared effects of spring prescribed burns and wildfires that occurred in the same...
Author(s): Kirsten Stephan, Kathleen L. Kavanagh, Akihiro Koyama
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

National to local: a pre & post assessment of the Fuel Characteristic Classification System (FCCS) landscape variables for the Confederated Salish and Kootenai Tribes
www.nrfirescience.org/resource/13486
A modified Fuel Characteristic and Classification System (FCCS) fuelbed was created for the Confederated Salish & Kootenai Tribes (CSKT) of Montana. This crosswalk of data combined two principal sources of data: (1) locally the Bureau of Indian Affairs (BIA) Continuous Forest Inventory Data (CFI) and (2) nationally the US Forest...
Author(s): Laurel L. James
Year Published: 2012
Type: Document
Dissertation or Thesis

Fuel treatment impacts on estimated wildfire carbon loss from forests in Montana, Oregon, California, and Arizona
www.nrfirescience.org/resource/8324
Using forests to sequester carbon in response to anthropogenically induced climate change is being considered across the globe. A recent U.S. executive order mandated that all federal agencies account for sequestration and emissions of greenhouse gases, highlighting the importance of understanding how forest carbon stocks are...
Author(s): Scott L. Stephens, Ralph E. Boerner, Jason J. Moghaddas, Emily E. Y. Moghaddas, Brandon M. Collins, Christopher B. Dow, Carleton B. Edminster, Carl E. Fiedler, Danny L. Fry, Bruce R. Hartsough, Jon E. Keeley, Eric E. Knapp, James D. McIver, Carl N. Skinner
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Fire-injured ponderosa pine provide a pulsed resource for bark beetles
www.nrfirescience.org/resource/8353
Bark beetles can cause substantial mortality of trees that would otherwise survive fire injuries. Resin response of fire-injured northern Rocky Mountain ponderosa pine (Pinus ponderosa Douglas ex P. Lawson... 
Author(s): Ryan S. Davis, Sharon M. Hood, Barbara J. Bentz
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Mapped versus actual burned area within wildfire perimeters: characterizing the unburned
www.nrfirescience.org/resource/8350
For decades, wildfire studies have utilized fire occurrence as the primary data source for investigating the causes and effects of wildfire on the landscape. Fire occurrence data fall primarily into two categories: ignition points and perimeter polygons which are used to calculate a 'burned area' for a fire. However, understanding...

Author(s): Crystal A. Kolden, James A. Lutz, Carl H. Key, Jonathan T. Kane, Jan W. van Wagendonk
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Cornus canadensis (bunchberry)
www.nrfirescience.org/resource/10680
This FEIS species review synthesizes information on the relationship of Cornus canadensis (bunchberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Corey L. Gucker
Year Published: 2012
Type: Document
Synthesis

A comparison of two methods for estimating conifer live foliar moisture content
www.nrfirescience.org/resource/8319
Foliar moisture content is an important factor regulating how wildland fires ignite in and spread through live fuels but moisture content determination methods are rarely standardised between studies. One such difference lies between the uses of rapid moisture analysers or drying ovens. Both of these methods are commonly used in...
Author(s): William Matt Jolly, Ann M. Hadlow
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Ranunculus glaberrimus (sagebrush buttercup)
www.nrfirescience.org/resource/10794
This FEIS species review synthesizes information on the relationship of Ranunculus glaberrimus (sagebrush buttercup) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Rachelle Meyer
Year Published: 2012
Type: Document
Synthesis

Mountain pine beetle attack alters the chemistry and flammability of lodgepole pine foliage
www.nrfirescience.org/resource/11488
During periods with epidemic mountain pine beetle (Dendroctonus ponderosae Hopkins) populations in lodgepole pine (Pinus contorta Dougl. ex Loud. var. latifolia Engelm.) forests, large amounts of tree foliage are thought to undergo changes in moisture content and chemistry brought about by tree decline and death. However, many of...
Author(s): Wesley G. Page, Michael J. Jenkins, Justin B. Runyon
Year Published: 2012
Type: Document
Relationships between moisture, chemistry, and ignition of Pinus contorta needles during the early stages of mountain pine beetle attack

Very little is known about how foliar moisture and chemistry change after a mountain pine beetle attack and even less is known about how these intrinsic foliar characteristics alter foliage ignitability. Here, we examine the fuel characteristics and ignition potential of Pinus contorta (lodgepole pine) foliage during the early...

Author(s): William Matt Jolly, Russell A. Parsons, Ann M. Hadlow, Greg M. Cohn, Sara S. McAllister, John B. Popp, Robert M. Hubbard, Jose F. Negron
Year Published: 2012
Type: Document

Pattern and process of prescribed fires influence effectiveness at reducing wildfire severity in dry coniferous forests

We examined the effects of three early season (spring) prescribed fires on burn severity patterns of summer wildfires that occurred 1-3 years post-treatment in a mixed conifer forest in central Idaho. Wildfire and prescribed fire burn severities were estimated as the difference in normalized burn ratio (dNBR) using Landsat imagery....

Author(s): Robert S. Arkle, David S. Pilliod, Justin L. Welty
Year Published: 2012
Type: Document

Measurements of convective and radiative heating in wildland fires

Time-resolved irradiance and convective heating and cooling of fast-response thermopile sensors were measured in 13 natural and prescribed wildland fires under a variety of fuel and ambient conditions. It was shown that a sensor exposed to the fire environment was subject to rapid fluctuations of convective transfer whereas...

Author(s): David Frankman, Brent W. Webb, Bret W. Butler, Daniel M. Jimenez, Jason M. Forthofer, Paul Sopko, Kyle S. Shannon, J. Kevin Hiers, Roger D. Ottmar
Year Published: 2012
Type: Document

Cascading impacts of bark beetle-caused tree mortality on coupled biogeophysical and biogeochemical processes

Recent large-scale outbreaks of bark beetle infestations have affected millions of hectares of forest in western North America, covering an area similar in size to that impacted by fire. Bark beetles kill host trees in affected areas, thereby altering water supply, carbon storage, and nutrient cycling in forests; for example, the...

Author(s): Steven L. Edburg, Jeffrey A. Hicke, Paul D. Brooks, Elise G. Pendall, Brent E. Ewers, Urszula Norton, David Gochis, Ethan D. Gutmann, Arjan J. H. Meddens
Year Published: 2012
Type: Document
Rubus parviflorus (thimbleberry)
www.nrfirescience.org/resource/10676
This FEIS species review synthesizes information on the relationship of Rubus parviflorus (thimbleberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Corey L. Gucker
Year Published: 2012
Type: Document
Synthesis

Betula occidentalis (water birch)
www.nrfirescience.org/resource/10582
This FEIS species review synthesizes information on the relationship of Betula occidentalis (water birch) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Corey L. Gucker
Year Published: 2012
Type: Document
Synthesis

Bark beetles and fire: two forces of nature transforming western forests
www.nrfirescience.org/resource/11984
Bark beetles are chewing a wide swath through forests across North America. Over the past few years, infestations have become epidemic in lodgepole and spruce-fir forests of the Intermountain West. The resulting extensive acreages of dead trees are alarming the public and raising concern about risk of severe fire. Researchers...
Author(s): Gail Wells
Year Published: 2012
Type: Document
Research Brief or Fact Sheet

Spatial bottom-up controls on fire likelihood vary across western North America
www.nrfirescience.org/resource/8311
The unique nature of landscapes has challenged our ability to make generalizations about the effects of bottom-up controls on fire regimes. For four geographically distinct fire-prone landscapes in western North America, we used a consistent simulation approach to quantify the influence of three key bottom-up factors, ignitions,...
Author(s): Sean A. Parks, Marc-Andre Parisien, Carol Miller
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Characterizing fire-on-fire interactions in three large wilderness areas
www.nrfirescience.org/resource/8339
The interaction of fires, where one fire burns into another recently burned area, is receiving increased attention from scientists and land managers wishing to describe the role of fire scars in affecting landscape pattern and future fire spread. Here, we quantify fire-on-fire interactions in terms of
Toxicodendron radicans, Toxicodendron rydbergii (eastern poison-ivy, western poison-ivy)

This FEIS species review synthesizes information on the relationship of Toxicodendron radicans, Toxicodendron rydbergii (eastern poison-ivy, western poison-ivy) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on...

Author(s): Robin J. Innes
Year Published: 2012
Type: Document

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

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

Author(s): Danielle K. Mazzotta
Year Published: 2012
Type: Document

Principal short-term findings of the National Fire and Fire Surrogate study

Principal findings of the National Fire and Fire Surrogate (FFS) study are presented in an annotated bibliography and summarized in tabular form by site, discipline (ecosystem component), treatment type, and major theme. Composed of 12 sites, the FFS is a comprehensive multidisciplinary experiment designed to evaluate the costs and...

Author(s): James D. McIver, Karen Erickson, Andrew P. Youngblood
Year Published: 2012
Type: Document

Synthesis, Technical Report or White Paper

Fire-induced shifts in overstory tree species composition and associated understory plant composition in Glacier National Park, Montana

In Rocky Mountain forests, fire can act as a mechanism of change in plant community composition if postfire conditions favor establishment of species other than those that dominated prefire tree communities. We sampled pre and postfire overstory and postfire understory species following recent (1988-2006) stand-replacing fires in...

Author(s): David A. McKenzie, Daniel B. Tinker
Year Published: 2012
Type: Document
Landscape composition in aspen woodlands under various modeled fire regimes
www.nrfirescience.org/resource/12114
Quaking aspen (Populus tremuloides) is declining across the western United States. Aspen habitats are diverse plant communities in this region and loss of these habitats can cause shifts in biodiversity, productivity, and hydrology across spatial scales. Western aspen occurs on the majority of sites seral to conifer species, and...
Author(s): Eva K. Strand, Stephen C. Bunting, Lee A. Vierling
Year Published: 2012
Type: Document
Conference Proceedings

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
Technical Report or White Paper

Numerical simulation of crown fire hazard immediately after bark beetle-caused mortality in lodgepole pine forests
www.nrfirescience.org/resource/8325
Quantifying the effects of mountain pine beetle (MPB)-caused tree mortality on potential crown fire hazard has been challenging partly because of limitations in current operational fire behavior models. Such models are not capable of accounting for fuel heterogeneity resulting from an outbreak. Further, the coupled interactions...
Author(s): Chad M. Hoffman, Penelope Morgan, William E. Mell, Russell A. Parsons, Eva K. Strand, Stephen Cook
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. forest sector
www.nrfirescience.org/resource/12567
This report is a scientific assessment of the current condition and likely future condition of forest resources in the United States relative to climatic variability and change. It serves as the U.S. Forest Service forest sector technical report for the National Climate Assessment and includes descriptions of key regional issues and...
Year Published: 2012
Type: Document
Synthesis, Technical Report or White Paper
Odocoileus hemionus (mule deer)
www.nrfirescience.org/resource/10521
This FEIS species review synthesizes information on the relationship of Odocoileus hemionus (mule deer) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Robin J. Innes
Year Published: 2012
Type: Document
Synthesis

Effect of crown class and habitat type on climate-growth relationships of ponderosa pine and Douglas-fir
www.nrfirescience.org/resource/11938
There is increasing interest in actively managing forests to increase their resilience to climate-related changes. Although forest managers rely heavily on the use of silvicultural treatments that manipulate stand structure and stand dynamics to modify responses to climate change, few studies have directly assessed the effects of...
Author(s): Gunnar C. Carnwath, David W. Peterson, Cara R. Nelson
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Spatial scaling of wildland fuels for six forest and rangeland ecosystems of the Northern Rocky Mountains, USA
www.nrfirescience.org/resource/8355
Wildland fuels are important to fire managers because they can be manipulated to achieve management goals, such as restoring ecosystems, decreasing fire intensity, minimizing plant mortality, and reducing erosion. However, it is difficult to accurately measure, describe, and map wildland fuels because of the great variability of...
Author(s): Robert E. Keane, Kathy L. Gray, Valentina Bacciu, Signe B. Leirfallom
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Spatially extensive reconstructions show variable-severity fire and heterogeneous structure in historical western United States dry forests
www.nrfirescience.org/resource/13484
Aim: Wildfire is often considered more severe now than historically in dry forests of the western United States. Tree-ring reconstructions, which suggest that historical dry forests were park-like with large, old trees maintained by low-severity fires, are from small, scattered studies. To overcome this limitation, we developed...
Author(s): William L. Baker, Mark A. Williams
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Changing growth response to wildfire in old-growth ponderosa pine trees in montane forests of north central Idaho
www.nrfirescience.org/resource/8323
North American fire-adapted forests are experiencing changes in fire frequency and climate. These
novel conditions may alter post-wildfire responses of fire-adapted trees that survive fires, a topic that has received little attention. Historical, frequent, low-intensity wildfire in many fire-adapted forests is generally thought to...

Author(s): Eric G. Keeling, Anna Sala
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Salix amygdaloides (peachleaf willow)
www.nrfirescience.org/resource/10658
This FEIS species review synthesizes information on the relationship of Salix amygdaloides (peachleaf willow) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Janet L. Fryer
Year Published: 2012
Type: Document
Synthesis

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

Fuels and fire behavior dynamics in bark beetle-attacked forests in Western North America and implications for fire management
www.nrfirescience.org/resource/8320
Declining forest health attributed to associations between extensive bark beetle-caused tree mortality, accumulations of hazardous fuels, wildfire, and climate change have catalyzed changes in forest health and wildfire protection policies of land management agencies. These changes subsequently prompted research to investigate the...
Author(s): Michael J. Jenkins, Wesley G. Page, Elizabeth G. Hebertson, Martin E. Alexander
Year Published: 2012
Type: Document
Book or Chapter or Journal Article, Synthesis

Quantifying the threat of unsuppressed wildfires reaching the adjacent wildland-urban interface on the Bridger-Teton National Forest, Wyoming, USA
www.nrfirescience.org/resource/8349
An important objective for many federal land management agencies is to restore fire to ecosystems that have experienced fire suppression or exclusion over the last century. Managing wildfires for resource objectives (i.e., allowing wildfires to burn in the absence of suppression) is an important tool for restoring such fire-adapted...
Author(s): Joe H. Scott, Don Helmbrecht, Sean A. Parks, Carol Miller
Year Published: 2012
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
Book or Chapter or Journal Article, Synthesis

Cornus sericea (red-osier dogwood)

www.nrfirescience.org/resource/10629

This FEIS species review synthesizes information on the relationship of Cornus sericea (red-osier dogwood) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Corey L. Gucker
Year Published: 2012
Type: Document
Synthesis

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. Mc Caulghhey, Justin B. Runyon
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 available spatial reference...

Author(s): Andrew J. Larson, Derek J. Churchill
Year Published: 2012
Type: Document
Book or Chapter or Journal Article, Synthesis
The effect of sampling rate on interpretation of the temporal characteristics of radiative and convective heating in wildland flames

www.nrfirescience.org/resource/8373

Time-resolved radiative and convective heating measurements were collected on a prescribed burn in coniferous fuels at a sampling frequency of 500 Hz. Evaluation of the data in the time and frequency domain indicate that this sampling rate was sufficient to capture the temporal fluctuations of radiative and convective heating. The...

Author(s): David Frankman, Brent W. Webb, Bret W. Butler, Daniel M. Jimenez, Michael G. Harrington
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Human relationships to fire prone ecosystems: mapping values at risk on contested landscapes

www.nrfirescience.org/resource/13510

A key problem in developing a better understanding of different responses to landscape level management actions, such as fuel treatments, is being able to confidently record and accurately spatially delineate the meanings stakeholders ascribe to the landscape. To more accurately understand these relationships with the Bitterroot...

Author(s): Kari Gunderson, Stephen J. Carver, Brett Davis
Year Published: 2011
Type: Document
Conference Proceedings

Woodpecker habitat after the fire

www.nrfirescience.org/resource/13508

Public land managers are asked to minimize fuel levels after fires, including using techniques such as salvage logging. They are also responsible for maintaining suitable wildlife habitat, especially for species of concern to state and federal agencies. An area where these responsibilities could conflict is in the use of salvage...

Author(s): Victoria A. Saab
Year Published: 2011
Type: Document
Research Brief or Fact Sheet

Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions?

www.nrfirescience.org/resource/8300

It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating...

Author(s): John L. Campbell, Mark E. Harmon, Stephen R. Mitchell
Year Published: 2011
Type: Document
Book or Chapter or Journal Article, Synthesis

Euphorbia esula (leafy spurge)

www.nrfirescience.org/resource/10451

This FEIS species review synthesizes information on the relationship of Euphorbia esula (leafy spurge) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the
This FEIS species review synthesizes information on the relationship of Oreamnos americanus (mountain goat) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology,...

This FEIS species review synthesizes information on the relationship of Alnus incana, Alnus incana subsp. rugosa, Alnus incana subsp. tenuifolia (gray alder, speckled alder, thinleaf alder) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations....

This FEIS species review synthesizes information on the relationship of Antennaria parvifolia (littleleaf pussytoes) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

This FEIS species review synthesizes information on the relationship of Picoides arcticus (black-backed woodpecker) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Physical, chemical, and hydrological properties of ponderosa pine ash

www.nrfirescience.org/resource/8274

In this study, ash is analyzed as a geological material; in particular, we focus on ash produced by the burning of Ponderosa pine, a conifer that is widespread throughout mountainous landscapes of western North America. One set of ash samples used in the analysis was collected from a wildfire site and another set was created in the...

Author(s): Emmanuel J. Gabet, Andy Bookter
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

The ecology of mixed severity fire regimes in Washington, Oregon, and Northern California

www.nrfirescience.org/resource/13580

Forests characterized by mixed-severity fires occupy a broad moisture gradient between lower elevation forests typified by low-severity fires and higher elevation forests in which high-severity, stand replacing fires are the norm. Mixed-severity forest types are poorly documented and little understood but likely occupy significant...

Author(s): David A. Perry, Paul F. Hessburg, Carl N. Skinner, Thomas A. Spies, Scott L. Stephens, Alan H. Taylor, Jerry F. Franklin, Brenda McComb, Gregg M. Riegel
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Muhlenbergia racemosa (green muhly)

www.nrfirescience.org/resource/10939

This FEIS species review synthesizes information on the relationship of Muhlenbergia racemosa (green muhly) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...

Author(s): Kristin L. Zouhar
Year Published: 2011
Type: Document
Synthesis

A tool to estimate the impact of bark beetle activity on fuels and fire behavior

www.nrfirescience.org/resource/12129

Recent bark beetle outbreaks have resulted in the loss of hundreds of thousands of conifers on approximately 74 million acres (30 million hectares) of forest in western North America during the last decade. Stand conditions, drought, and warming temperatures have contributed to the severity of these outbreaks, particularly in high-...

Author(s): Michael J. Jenkins, Elizabeth G. Hebertson, Wesley G. Page, Wanda E. Lindquist
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Modeling effects of climate change and fire management on western white pine (Pinus monticola) in the northern rocky mountains, USA

www.nrfirescience.org/resource/13512

Climate change is projected to profoundly influence vegetation patterns and community compositions, either directly through increased species mortality and shifts in species distributions or indirectly
through disturbance dynamics such as increased wildfire activity and extent, shifting fire regimes, and pathogenesis. Mountainous...
Author(s): Rachel A. Loehman, Jason A. Clark, Robert E. Keane
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

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

Fire and fish dynamics in a changing climate
www.nrfirescience.org/resource/13509
Wildland fire is a natural disturbance that affects the distribution and abundance of native fishes in the Rocky Mountain West (Rieman and others 2003). Fire can remove riparian vegetation, increasing direct solar radiation to the stream surface and leading to warmer summer water temperatures. Fire can also consume vegetation and...
Author(s): Lisa M. Holsinger, Robert E. Keane
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Lack of fire has limited physiological impact on old-growth ponderosa pine in dry montane forests of north-central Idaho
www.nrfirescience.org/resource/8299
Reduced frequency of fire in historically fire-adapted ecosystems may have adverse effects on ecosystem structure, function, and resilience. Lack of fire increases stand density and promotes successional replacement of seral dominant trees by late-successional, more shade-tolerant species. These changes are thought to increase...
Author(s): Eric G. Keeling, Anna Sala, Thomas H. DeLuca
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Cervus elaphus (elk)
www.nrfirescience.org/resource/10523
This FEIS species review synthesizes information on the relationship of Cervus elaphus (elk) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Robin J. Innes
Year Published: 2011
Type: Document
Fuel and fire behavior in high-elevation five-needle pines affected by mountain pine beetle

Bark beetle-caused tree mortality in conifer forests affects the quantity and quality of forest fuels and has long been assumed to increase fire hazard and potential fire behavior. In reality, bark beetles and their effects on fuel accumulation and subsequent fire hazard have only recently been described. We have extensively sampled...

Influence of fire on native and nonnative salmonid populations and habitat in a western Montana basin

Anticipated increases in the frequency and severity of wildfire may threaten the persistence of native salmonid populations in headwater streams in western North America. This study used extensive pre- and postfire data to assess whether wildfire leads to hypothesized declines in native westslope cutthroat trout Oncorhynchus clarkii...

Simulating fuel treatment effects in dry forests of the western United States: testing the principles of a fire-safe forest

We used the Fire and Fuels Extension to the Forest Vegetation Simulator (FFE-FVS) to simulate fuel treatment effects on 45,162 stands in low- to midelevation dry forests (e.g., ponderosa pine (Pinus ponderosa Dougl. ex. P....

Deriving fuel mass by size class in Douglas-fir (Pseudotsuga menziesii) using terrestrial laser scanning

Requirements for describing coniferous forests are changing in response to wildfire concerns, bio-energy needs, and climate change interests. At the same time, technology advancements are transforming how forest properties can be measured. Terrestrial Laser Scanning (TLS) is yielding promising results for measuring tree biomass...

Bonasa umbellus (ruffed grouse)
This FEIS species review synthesizes information on the relationship of Bonasa umbellus (ruffed grouse) to fire–how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Rachelle Meyer
Year Published: 2011
Type: Document
Synthesis

Effects of wildfire on stream temperatures in the Bitterroot River Basin, Montana
www.nrfirescience.org/resource/8269
Wildfire is a common natural disturbance that can influence stream ecosystems. Of particular concern are increases in water temperature during and following fires, but studies of these phenomena are uncommon. We examined effects of wildfires in 2000 on maximum water temperature for a suite of second- to fourth-order streams with a...

Author(s): Shad K. Mahlum, Lisa A. Eby, Michael K. Young, Chris G. Clancy, Mike Jakober
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

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

Prescribed fires as ecological surrogates for wildfires: a stream and riparian perspective
www.nrfirescience.org/resource/11444
Forest managers use prescribed fire to reduce wildfire risk and to provide resource benefits, yet little information is available on whether prescribed fires can function as ecological surrogates for wildfire in fire-prone landscapes. Information on impacts and benefits of this management tool on stream and riparian ecosystems is...

Author(s): Robert S. Arkle, David S. Pilliod
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Euphorbia cyparissias (cypress spruge)
www.nrfirescience.org/resource/10455
This FEIS species review synthesizes information on the relationship of Euphorbia cyparissias (cypress spruge) to fire–how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...

Author(s): Corey L. Gucker
Year Published: 2010
Type: Document
Alces americanus (moose)
www.nrfirescience.org/resource/10524
This FEIS species review synthesizes information on the relationship of Alces americanus (moose) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Robin J. Innes
Year Published: 2010
Type: Document

Prescribed fire as a means of reducing forest carbon emissions in the western United States
www.nrfirescience.org/resource/8328
Carbon sequestration by forested ecosystems offers a potential climate change mitigation benefit. However, wildfire has the potential to reverse this benefit. In the western United States, climate change and land management practices have led to increases in wildfire intensity and size. One potential means of reducing carbon...
Author(s): Christine Wiedinmyer, Matthew D. Hurteau
Year Published: 2010
Type: Document

Experimental measurements during combustion of moist individual foliage samples
www.nrfirescience.org/resource/11434
Individual samples of high moisture fuels from the western and southern United States and humidified aspen excelsior were burned over a flat-flame burner at 987° ± 12°C and 10 ± 0.5 mol% O2. Time-dependent mass and temperature profiles of these samples were obtained and analysed. It was observed that significant amounts of...
Author(s): Brent M. Pickett, Carl Isackson, Rebecca Wunder, Thomas H. Fletcher, Bret W. Butler, David R. Weise
Year Published: 2010
Type: Document

Fire and mice: seed predation moderates fire's influence on conifer recruitment
www.nrfirescience.org/resource/8207
In fire-adapted ecosystems, fire is presumed to be the dominant ecological force, and little is known about how consumer interactions influence forest regeneration. Here, we investigated seed predation by deer mice (Peromyscus maniculatus) and its effects on recruitment of ponderosa pine (Pinus ponderosa) and Douglas-fir (...)
Author(s): Rafal Zwolak, Dean E. Pearson, Yvette K. Ortega, Elizabeth E. Crone
Year Published: 2010
Type: Document

Linanthus pungens (granite prickly-phlox)
www.nrfirescience.org/resource/10520
This FEIS species review synthesizes information on the relationship of Linanthus pungens (granite
prickly-phlox) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Robin J. Innes
Year Published: 2010
Type: Document
Synthesis

**Schedonorus pratensis (meadow fescue)**
www.nrfirescience.org/resource/10472
This FEIS species review synthesizes information on the relationship of Schedonorus pratensis (meadow fescue) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...

Author(s): Katharine R. Stone
Year Published: 2010
Type: Document
Synthesis

**Blister rust and western forest biodiversity: ecology, values and outlook for white pines**
www.nrfirescience.org/resource/8234
Eight white pine species are widely distributed among the forests of western Canada and the United States. The different forest communities with these species contribute biodiversity to the western landscape. The trees themselves provide various ecosystem services, including wildlife habitat and watershed protection. White pine...

Author(s): Diana F. Tomback, Peter Achuff
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

**Holodiscus discolor (oceanspray)**
www.nrfirescience.org/resource/10653
This FEIS species review synthesizes information on the relationship of Holodiscus discolor (oceanspray) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Janet L. Fryer
Year Published: 2010
Type: Document
Synthesis

**Effects of biomass removal treatments on stand-level fire characteristics in major forest types of the Northern Rocky Mountains**
www.nrfirescience.org/resource/8189
Removal of dead and live biomass from forested stands affects subsequent fuel dynamics and fire potential. The amount of material left onsite after biomass removal operations can influence the intensity and severity of subsequent unplanned wildfires or prescribed burns. We developed a set of biomass removal treatment scenarios and...

Author(s): Elizabeth D. Reinhardt, Lisa M. Holsinger, Robert E. Keane
Year Published: 2010
Type: Document
Holodiscus dumosus (rockspirea)
www.nrfirescience.org/resource/10648
This FEIS species review synthesizes information on the relationship of Holodiscus dumosus (rockspirea) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Janet L. Fryer
Year Published: 2010
Type: Document
Synthesis

Climate change and bark beetles of the western United States and Canada: direct and indirect effects
www.nrfirescience.org/resource/8219
Climatic changes are predicted to significantly affect the frequency and severity of disturbances that shape forest ecosystems. We provide a synthesis of climate change effects on native bark beetles, important mortality agents of conifers in western North America. Because of differences in temperature-dependent life-history...
Author(s): Barbara J. Bentz, Jacques Regniere, Christopher J. Fettig, E. Matthew Hansen, Jane L. Hayes, Jeffrey A. Hicke, Rick G. Kelsey, Jose F. Negron, Steven J. Seybold
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

Critique of Sikkink and Keane's comparison of surface fuel sampling techniques
www.nrfirescience.org/resource/8370
The 2008 paper of Sikkink and Keane compared several methods to estimate surface fuel loading in western Montana: two widely used inventory techniques (planar intersect and fixed-area plot) and three methods that employ photographs as visual guides (photoload, photoload macroplot and photo series). We feel, however, that their study...
Author(s): Clinton S. Wright, Roger D. Ottmar, Robert E. Vihnanek
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Melilotus alba, Melilotus officinalis (white sweetclover, yellow sweetclover)
www.nrfirescience.org/resource/10456
This FEIS species review synthesizes information on the relationship of Melilotus alba, Melilotus officinalis (white sweetclover, yellow sweetclover) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is...
Author(s): Corey L. Gucker
Year Published: 2010
Type: Document
Synthesis

Evaluation of forest management systems under risk of wildfire
www.nrfirescience.org/resource/8336
We evaluate the economic efficiency of even- and uneven-aged management systems under risk of wildfire. The management problems are formulated for a mixed-conifer stand and approximations of the optimal solutions are obtained using simulation optimization. The Northern Idaho variant of the Forest Vegetation Simulator and its Fire...

Author(s): Kari Hyytiainen, Robert G. Haight
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

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

Prunus americana (American plum)
www.nrfirescience.org/resource/10661
This FEIS species review synthesizes information on the relationship of Prunus americana (American plum) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Janet L. Fryer
Year Published: 2010
Type: Document
Synthesis

Burn severity mapping using simulation modelling and satellite imagery
www.nrfirescience.org/resource/8205
Although burn severity maps derived from satellite imagery provide a landscape view of fire impacts, fire effects simulation models can provide spatial fire severity estimates and add a biotic context in which to interpret severity. In this project, we evaluated two methods of mapping burn severity in the context of rapid post-fire...

Author(s): Eva C. Karau, Robert E. Keane
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Hieracium aurantiacum (orange hawkweed)
www.nrfirescience.org/resource/10474
This FEIS species review synthesizes information on the relationship of Hieracium aurantiacum (orange hawkweed) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species'...

Author(s): Katharine R. Stone
Year Published: 2010
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...
Author(s): Stefan Zeglen, John Pronos, H. Merler
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Polygonum aviculare (prostrate knotweed)
www.nrfirescience.org/resource/10471
This FEIS species review synthesizes information on the relationship of Polygonum aviculare (prostrate knotweed) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species'...
Author(s): Katharine R. Stone
Year Published: 2010
Type: Document
Synthesis

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

Martes americana (American marten)
www.nrfirescience.org/resource/10856
This FEIS species review synthesizes information on the relationship of Martes americana (American marten) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,....
Author(s): Katharine R. Stone
Year Published: 2010
Type: Document
Synthesis

Thinning and burning in dry coniferous forests of the western United States: effectiveness in altering diameter distributions
Western United States land managers are conducting fuel reduction and forest restoration treatments in forests with altered structural conditions. As part of the National Fire and Fire Surrogate (FFS) study, thinning and burning treatments were evaluated for changing forest structure. Shifts between pretreatment and posttreatment...

Author(s): Andrew P. Youngblood
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Disturbance and landscape dynamics in a changing world

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

Response of six non-native plant species to wildfires in the northern Rocky Mountains, USA

This paper presents early results on the response of six non-native invasive plant species to eight wildfires on six National Forests (NFs) in the northern Rocky Mountains, USA. Stratified random sampling was used to choose 224 stands based on burn severity, habitat type series, slope steepness, stand height, and stand density. Data...

Author(s): Dennis E. Ferguson, Christine L. Craig
Year Published: 2010
Type: Document
Technical Report or White Paper

Falco peregrinus (peregrine falcon)

This FEIS species review synthesizes information on the relationship of Falco peregrinus (peregrine falcon) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...

Author(s): Peggy Luensmann
Year Published: 2010
Type: Document
Synthesis

Late-Holocene relationships among fire, climate and vegetation in a forest-sagebrush ecotone of southwestern Idaho, USA

The forest-sagebrush ecotone is characterized by a more arid climate than forested regions; therefore, establishing fire histories using traditional methods (e.g. fire-scars from trees, charcoal in lake sediments) is problematic. This study uses radiocarbon dating of charcoal preserved in alluvial deposits to reconstruct a record of...

Author(s): Nathan A. Nelson, Jennifer L. Pierce
Effects of fuel treatments on carbon-disturbance relationships in forests of the Northern Rocky Mountains

Fuel treatments alter conditions in forested stands at the time of the treatment and subsequently. Fuel treatments reduce on-site carbon and also change the fire potential and expected outcome of future wildfires, including their carbon emissions. We simulated effects of fuel treatments on 140 stands representing seven major habitat...

Author(s): Elizabeth D. Reinhardt, Lisa M. Holsinger
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Ecological effects of prescribed fire season: a literature review and synthesis for managers

This synthesis project on season of prescribed burning is to summarize results from studies to date in order to provide managers a resource for predicting fire effects and understanding what variables drive these fire effects in different areas of the country with varying fire regimes. A secondary objective will be to identify key...

Author(s): Eric E. Knapp, Becky L. Estes, Carl N. Skinner
Year Published: 2009
Type: Document
Synthesis, Technical Report or White Paper

Response of bark beetles and their natural enemies to fire and fire surrogate treatments in mixed-conifer forests in western Montana

Four treatments (control, burn-only, thin-only, and thin-and-burn) were evaluated for their effects on bark beetle-caused mortality in both the short-term (one to four years) and the long-term (seven years) in mixed-conifer forests in western Montana, USA. In addition to assessing bark beetle responses to these treatments, we also...

Author(s): Diana L. Six, Kjerstin R. Skov
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Global warming and stress complexes in forests of western North America

A warmer climate in western North America will likely affect forests directly through soil moisture stress and indirectly through increased extent and severity of disturbances. We propose that stress complexes, combinations of biotic and abiotic stresses, compromise the vigor and ultimate sustainability of forest ecosystems. Across...

Author(s): Donald McKenzie, David L. Peterson, Jeremy J. Littell
Year Published: 2009
Type: Document
Book or Chapter or Journal Article, Synthesis
Fire treatment effects on vegetation structure, fuels, and potential fire severity in western U.S. forests
www.nrfirescience.org/resource/13352
Forest structure and species composition in many western U.S. coniferous forests have been altered through fire exclusion, past and ongoing harvesting practices, and livestock grazing over the 20th century. The effects of these activities have been most pronounced in seasonally dry, low and mid-elevation coniferous forests that once...
Author(s): Scott L. Stephens, Jason J. Moghaddas, Carleton B. Edminster, Carl E. Fiedler, Sally M. Haase, Michael G. Harrington, Jon E. Keeley, Eric E. Knapp, James D. McIver, Kerry L. Metlen, Carl N. Skinner, Andrew P. Youngblood
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Fire and bark beetle interactions
www.nrfirescience.org/resource/11071
Bark beetle populations are at outbreak conditions in many parts of the western United States and causing extensive tree mortality. Bark beetles interact with other disturbance agents in forest ecosystems, one of the primary being fires. In order to implement appropriate post-fire management of fire-damaged ecosystems, we need a...
Author(s): Ken E. Gibson, Jose F. Negron
Year Published: 2009
Type: Document
Conference Proceedings, Technical Report or White Paper

Widespread increase of tree mortality rates in the western United States
www.nrfirescience.org/resource/8321
Persistent changes in tree mortality rates can alter forest structure, composition, and ecosystem services such as carbon sequestration. Our analyses of longitudinal data from unmanaged old forests in the western United States showed that background (noncatastrophic) mortality rates have increased rapidly in recent decades, with...
Author(s): Phillip J. van Mantgem, Nathan L. Stephenson, John C. Byrne, Lori D. Daniels, Jerry F. Franklin, Peter Z. Fule, Mark E. Harmon, Andrew J. Larson, Jeremy M. Smith, Alan H. Taylor, Thomas T. Veblen
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Short-term effects of forest restoration management on non-symbiotic nitrogen-fixation in western Montana
www.nrfirescience.org/resource/13154
Forest restoration treatments involving selection harvest and prescribed fire have been applied throughout the Rocky Mountain West with only a limited understanding of how these treatments influence plant community composition and soil processes. Forest restoration treatments, especially those involving fire, have the potential to...
Author(s): Tricia A. Burgoyne, Thomas H. DeLuca
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Fuel treatment guidebook: illustrating treatment effects on fire hazard
The Guide to Fuel Treatments (Johnson and others 2007) analyzes potential fuel treatments and the potential effects of those treatments for dry forest lands in the Western United States. The guide examines low- to mid-elevation dry forest stands with high stem densities and heavy ladder fuels, which are currently common due to fire...

Author(s): Crystal L. Raymond
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Grus canadensis, Grus canadensis canadensis, Grus canadensis nesiotes, Grus canadensis pratensis, Grus canadensis pulla, Grus canadensis rowani, Grus canadensis tabida (sandhill crane species)

Author(s): Katharine R. Stone
Year Published: 2009
Type: Document
Synthesis

Artemisia nova (black sagebrush)

Author(s): Janet L. Fryer
Year Published: 2009
Type: Document
Synthesis

Potentilla hippociana (woolly cinquefoil)

Author(s): Rachelle Meyer
Year Published: 2009
Type: Document
Synthesis

Influence of wildfire severity on riparian plant community heterogeneity in an Idaho, USA wilderness

Despite the increasing recognition of riparian zones as important ecotones that link terrestrial and aquatic ecosystems and of fire as a critical natural disturbance, much remains unknown regarding the influence of fire on stream-riparian ecosystems. To further this understanding, we evaluated the effects
of mixed severity wildfire...
Author(s): Breeanne K. Jackson, S. Mazeika P. Sullivan
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Lubrecht State Experimental Forest prescribed fire effects study 1973-2006
www.nrfirescience.org/resource/11134
This data product contains pre and post fires stand and fuels data collected over a 33 year period. Rod Norum as part of his PhD dissertation work, began this study in 1973. He laid out 32 small (25 by 25 meter) plots in a Douglas fir/western larch stand on the University of Montana's Lubrecht Experimental Forest. Twenty of the...
Author(s): Elizabeth D. Reinhardt
Year Published: 2009
Type: Document
Technical Report or White Paper

Synthesis of knowledge on the effects of fire and fire surrogates on wildlife in U.S. dry forests
www.nrfirescience.org/resource/12617
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
Year Published: 2009
Type: Document
Synthesis, Technical Report or White Paper

Equations to convert compacted crown ratio to uncompacted crown ratio for trees in the Interior West
www.nrfirescience.org/resource/8368
Crown ratio is the proportion of total tree length supporting live foliage. Inventory programs of the US Forest Service generally define crown ratio in terms of compacted or uncompacted measurements. Measurement of compacted crown ratio (CCR) involves envisioning the transfer of lower branches of trees with asymmetric crowns to fill...
Author(s): Chris Toney, Matthew C. Reeves
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Berberis vulgaris (common barberry)
www.nrfirescience.org/resource/10454
This FEIS species review synthesizes information on the relationship of Berberis vulgaris (common barberry) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy....
Author(s): Corey L. Gucker
Year Published: 2009
Type: Document
Synthesis
Listening to the message of the Black-backed Woodpecker, a hot fire specialist

The Black-backed Woodpecker is an uncommon bird of the northern coniferous forests of North America. It is one of several species of fauna that are considered fire specialists. This woodpecker nests in cavities it creates in dead standing trees and feeds on wood-boring beetles and their larvae, which are also attracted to stressed...

Author(s): Elise LeQuire
Year Published: 2009
Type: Document
Research Brief or Fact Sheet

Assessing the performance of sampling designs for measuring abundance of understory plants after forest restoration

Accurate estimation of the responses of understory plants to natural and anthropogenic disturbance is essential for understanding efficacy and non-target effects of management and restoration activities. However, ability to assess changes in abundance of understory plants that result from disturbance may be hampered...

Author(s): Ilana L. Abrahamson
Year Published: 2009
Type: Document
Dissertation or Thesis

From the ground up, way up: measuring live fuel moisture with satellite imagery to fine-tune fire modeling in western ecosystems

Remote sensing from space may well become one of the world's most effective, accurate, and efficient ways to assess fire risk and thus manage large landscapes. The technology is evolving quickly, and researchers are busy keeping up. Some major western U.S. landscapes are just now being assessed for integrating remote sensing data...

Author(s): Rachel Clark
Year Published: 2009
Type: Document
Research Brief or Fact Sheet

Isatis tinctoria (dyer's woad)

This FEIS species review synthesizes information on the relationship of Isatis tinctoria (dyer's woad) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,....

Author(s): Kristin L. Zouhar
Year Published: 2009
Type: Document
Synthesis

The national fire and fire surrogate study: effects of fuel reduction methods on forest vegetation structure and fuels

Changes in vegetation and fuels were evaluated from measurements taken before and after fuel
reduction treatments (prescribed fire, mechanical treatments, and the combination of the two) at 12 Fire
and Fire Surrogate (FFS) sites located in forests with a surface fire regime across the conterminous
United States. To test the relative...
Author(s): Dylan W. Schwilk, Jon E. Keeley, Eric E. Knapp, James D. Mclver, John D. Bailey,
Christopher J. Fettig, Carl E. Fiedler, Richy J. Harrod, Jason J. Moghaddas, Kenneth W. Outcalt, Carl
N. Skinner, Scott L. Stephens, Thomas A. Waldrop, Daniel A. Yaussy, Andrew P. Youngblood
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Bark beetle conditions in western forests and formation of the Western Bark Beetle Research
Group
www.nrfirescience.org/resource/11069
The recent dramatic impacts of bark beetle outbreaks across conifer forests of the West have been
mapped and reported by entomology and pathology professionals with Forest Health Protection (FHP),
a component of USDA Forest Service's State and Private Forestry, and their state counterparts. These
forest conditions set the stage for...
Author(s): Robert J. Cain, Jane L. Hayes
Year Published: 2009
Type: Document
Conference Proceedings, Technical Report or White Paper

An analysis of Dodge's escape fire on the 1949 Mann Gulch Fire in terms of a survival zone for
wildland firefighters
www.nrfirescience.org/resource/11020
The Wildland Fire Operations Research Group of FPInovations-Feric Division in collaboration with the
University of Alberta initiated a project in late 2007 at the request of its stakeholders to examine and
define the limits of wildland firefighter safety and survival zones. Part of this project involves examining
past wildfire...
Author(s): Martin E. Alexander, Mark Y. Ackerman, Gregory J. Baxter
Year Published: 2009
Type: Document
Conference Proceedings

Adapting the Water Erosion Prediction Project (WEPP) model for forest applications
www.nrfirescience.org/resource/11423
There has been an increasing public concern over forest stream pollution by excessive sedimentation
due to natural or human disturbances. Adequate erosion simulation tools are needed for sound
management of forest resources. The Water Erosion Prediction Project (WEPP) watershed model has
proved useful in forest applications where...
Author(s): Shuhui Dun, Joan Q. Wu, William J. Elliot, Peter R. Robichaud, Dennis C. Flanagan, James
R. Frankenberger, Robert E. Brown, Arthur C. Xu
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Effects of timber harvest following wildfire in western North America
www.nrfirescience.org/resource/11122
Timber harvest following wildfire leads to different outcomes depending on the biophysical setting of the
forest, pattern of burn severity, operational aspects of tree removal, and other management activities.
Fire effects range from relatively minor, in which fire burns through the understory and may kill a few
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

Mapping tradeoffs in values at risk at the interface between wilderness and non-wilderness lands

www.nrfirescience.org/resource/11063

On the Flathead Indian Reservation in Montana, U.S., the Mission Mountains Tribal Wilderness is bordered by a buffer zone. To successfully improve forest health within that buffer zone and restore fire in the wilderness, the managing agency and the public need to work together to find solutions to increasingly threatening fuel...

Author(s): Alan E. Watson, Roian Matt, Tim Waters, Kari Gunderson, Stephen J. Carver, Brett Davis
Year Published: 2009
Type: Document
Conference Proceedings

Muhlenbergia cuspidata (stonyhills muhly)

www.nrfirescience.org/resource/10652

This FEIS species review synthesizes information on the relationship of Muhlenbergia cuspidata (stonyhills muhly) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Janet L. Fryer
Year Published: 2009
Type: Document
Synthesis

Assessing fuel treatment effectiveness using satellite imagery and spatial statistics

www.nrfirescience.org/resource/8227

Understanding the influences of forest management practices on wildfire severity is critical in fire-prone ecosystems of the western United States. Newly available geospatial data sets characterizing vegetation, fuels, topography, and burn severity offer new opportunities for studying fuel treatment effectiveness at regional to...

Author(s): Michael C. Wimberly, Mark A. Cochrane, Adam D. Baer, Kari Pabst
Year Published: 2009
Type: Document
Book or Chapter or Journal Article
Three years of hillslope sediment yields following the Valley Complex fires, western Montana

www.nrfirescience.org/resource/11147
The 2000 Bitterroot Valley wildfires provided an opportunity to measure post-fire effects and recovery rates. We established 24 small (0.01 ha [0.02 acre]) plots in four high-severity burn sites. We measured sediment yields at each site with silt fences. We also measured rainfall characteristics, soil water repellency, vegetative...
Author(s): Peter R. Robichaud, Joseph W. Wagenbrenner, Robert E. Brown, Kevin M. Spigel
Year Published: 2009
Type: Document
Technical Report or White Paper

Carex inops subsp. heliophila, Carex inops subsp. inops (sun sedge, long-stolon sedge)

www.nrfirescience.org/resource/10649
This FEIS species review synthesizes information on the relationship of Carex inops subsp. heliophila, Carex inops subsp. inops (sun sedge, long-stolon sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on...
Author(s): Janet L. Fryer
Year Published: 2009
Type: Document
Synthesis

Polytrichum juniperinum (juniper haircap moss)

www.nrfirescience.org/resource/10647
This FEIS species review synthesizes information on the relationship of Polytrichum juniperinum (juniper haircap moss) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic...
Author(s): Janet L. Fryer
Year Published: 2008
Type: Document
Synthesis

Nucifraga columbiana (Clark's nutcracker)

www.nrfirescience.org/resource/10782
This FEIS species review synthesizes information on the relationship of Nucifraga columbiana (Clark's nutcracker) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic...
Author(s): Nancy E. McMurray
Year Published: 2008
Type: Document
Synthesis

Burn and they will come! The western regional birds and burns study examines bird responses to prescribed fire

www.nrfirescience.org/resource/11088
Although prescribed fire is increasingly being used in ponderosa pine forests as a management tool to reduce the risk of future high-severity wildfire, its effects on wildlife habitat have rarely been examined.
The Birds and Burns Network was created to assist managers in planning prescribed fire projects that will reduce fuels and...
Author(s): Jonathan Thompson
Year Published: 2008
Type: Document
Research Brief or Fact Sheet

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

Cladonia arbuscula, Cladonia mitis, Cladonia rangeferia, Cladonia stellaris (shrubby reindeer lichen, green reindeer lichen, gray reindeer lichen, alpine reindeer lichen)
www.nrfirescience.org/resource/10800
This FEIS species review synthesizes information on the relationship of Cladonia arbuscula, Cladonia mitis, Cladonia rangeferia, Cladonia stellaris (shrubby reindeer lichen, green reindeer lichen, gray reindeer lichen, alpine reindeer lichen) to fire--how fire affects the species and its habitat, effects of the species on fuels and...
Author(s): Gregory T. Munger
Year Published: 2008
Type: Document
Synthesis

A comparison of five sampling techniques to estimate surface fuel loading in montane forests
www.nrfirescience.org/resource/8164
Designing a fuel-sampling program that accurately and efficiently assesses fuel load at relevant spatial scales requires knowledge of each sample method's strengths and weaknesses. We obtained loading values for six fuel components using five fuel load sampling techniques at five locations in western Montana, USA. The techniques...
Author(s): Pamela G. Sikkink, Robert E. Keane
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Bark beetles, fuels, fires, and implications for forest management in the Intermountain West
www.nrfirescience.org/resource/8239
Bark beetle-caused tree mortality in conifer forests affects the quantity and quality of forest fuels and has long been assumed to increase fire hazard and potential fire behavior. In reality, bark beetles, and their effects on fuel accumulation, and subsequent fire hazard, are poorly understood. We extensively sampled fuels in...
Author(s): Michael J. Jenkins, Elizabeth G. Hebertson, Wesley G. Page, C. Arik Jorgensen
Year Published: 2008
Multi-season climate synchronized historical fires in dry forests (1650-1900), Northern Rockies, USA
www.nrfirescience.org/resource/8388
Our objective was to infer the climate drivers of regionally synchronous fire years in dry forests of the U.S. northern Rockies in Idaho and western Montana. During our analysis period (1650-1900), we reconstructed fires from 9245 fire scars on 576 trees (mostly ponderosa pine, Pinus ponderosa P....
Author(s): Emily K. Heyerdahl, Penelope Morgan, James P. Riser
Year Published: 2008

Long-term fire history from alluvial fan sediments: the role of drought and climate variability, and implications for management of Rocky Mountain forests
www.nrfirescience.org/resource/8203
Alluvial fan deposits are widespread and preserve millennial-length records of fire. We used these records to examine changes in fire regimes over the last 2000 years in Yellowstone National Park mixed-conifer forests and drier central Idaho ponderosa pine forests. In Idaho, frequent, small, fire-related erosional events occurred...
Author(s): Jennifer L. Pierce, Grant A. Meyer
Year Published: 2008

Crossdated fire histories (1650-1900) from ponderosa pine-dominated forests of Idaho and western Montana
www.nrfirescience.org/resource/11124
For a broader study of the climate drivers of regional-fire years in the Northern Rockies, we reconstructed a history of surface fires at 21 sites in Idaho and western Montana. We targeted sites that historically sustained frequent surface fires and were dominated or codominated by ponderosa pine (Pinus ponderosa P....
Author(s): Emily K. Heyerdahl, Penelope Morgan, James P. Riser
Year Published: 2008

Biophysical controls on surface fuel litterfall and decomposition in the Northern Rocky Mountains, USA
www.nrfirescience.org/resource/8161
Litterfall and decomposition rates of the organic matter that comprise forest fuels are important to fire management, because they define fuel treatment longevity and provide parameters to design, test, and validate ecosystem models. This study explores the environmental factors that control litterfall and decomposition in the...
Author(s): Robert E. Keane
Year Published: 2008
**Carex rossii (Ross's sedge)**
www.nrfirescience.org/resource/10594
This FEIS species review synthesizes information on the relationship of Carex rossii (Ross's sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Michelle B. Anderson
Year Published: 2008
Type: Document
Synthesis

**The effect of ash on runoff and erosion after a severe forest wildfire, Montana, USA**
www.nrfirescience.org/resource/8199
Ash formed by the combustion of vegetation and the litter and duff layers may affect runoff and erosion rates in the period immediately following wildfires, but only a handful of studies have specifically measured its effect. Approximately 1 month after the 2005 Tarkio Fire in western Montana, we applied simulated rainfall for 1 h...
Author(s): Scott W. Woods, Victoria N. Balfour
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

**Managing fire risk in the forests of the U.S. inland Northwest: a classic "wicked problem" in public land policy**
www.nrfirescience.org/resource/11066
In their classic article published in the Journal of Forestry in 1986, Gerald Allen and Ernest Gould stated that the most daunting problems associated with public forest management have a "wicked" element: "Wicked problems share characteristics. Each can be considered as simply a symptom of some higher order problem-The definition...
Author(s): Matthew S. Carroll, Keith A. Blatner, Patricia J. Cohn, Charles E. Keegan, Todd A. Morgan
Year Published: 2008
Type: Document

**The ecological importance of severe wildfires: some like it hot**
www.nrfirescience.org/resource/8229
Many scientists and forest land managers concur that past fire suppression, grazing, and timber harvesting practices have created unnatural and unhealthy conditions in the dry, ponderosa pine forests of the western United States. Specifically, such forests are said to carry higher fuel loads and experience fires that are more severe...
Author(s): Richard L. Hutto
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

**Market impacts of a multiyear mechanical fuel treatment program in the U.S.**
www.nrfirescience.org/resource/8125
We describe a two-stage model of global log and chip markets that evaluates the spatial and temporal economic effects of government- subsidized fire-related mechanical fuel treatment programs in the U.S.West and South. The first stage is a goal program that allocates subsidies according to fire risk and location priorities, given a...
**Gulo gulo (wolverine)**
www.nrfirescience.org/resource/10747
This FEIS species review synthesizes information on the relationship of Gulo gulo (wolverine) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Peggy Luensmann
Year Published: 2008
Type: Document
Synthesis

**Using bark char codes to predict post-fire cambium mortality**
www.nrfirescience.org/resource/8171
Cambium injury is an important factor in post-fire tree survival. Measurements that quantify the degree of bark charring on tree stems after fire are often used as surrogates for direct cambium injury because they are relatively easy to assign and are non-destructive. However, bark char codes based on these measurements have been...
Author(s): Sharon M. Hood, Danny R. Cluck, Sheri L. Smith, Kevin C. Ryan
Year Published: 2008
Type: Document

**Forest harvest can increase subsequent forest fire severity**
www.nrfirescience.org/resource/11054
The USDA Forest Service is progressing from a land management strategy oriented around timber extraction towards one oriented around maintaining healthy forested lands. The healthy Forest Initiative promotes the idea of broadscale forest thinning and fuel treatments as an effective means for mitigating hazardous fuel conditions and...
Author(s): Carter Stone, Andrew T. Hudak, Penelope Morgan
Year Published: 2008
Type: Document
Conference Proceedings, Technical Report or White Paper

**The tao of treating weeds: reaching for restoration in the northern Rocky Mountains**
www.nrfirescience.org/resource/11093
Noxious weeds are a serious problem that is spreading across the West. Herbicides such as Picloram have proven to be powerful tools in reducing weed invaders, although use of this tool has often produced unintended consequences. Broadleaf herbicides kill forbs, such as the noxious knapweed, but also harm native forbs such as...
Author(s): Lisa-Natalie Anjozian
Year Published: 2008
Type: Document
Research Brief or Fact Sheet

**Potentilla glandulosa (sticky cinquefoil)**
This FEIS species review synthesizes information on the relationship of Potentilla glandulosa (sticky cinquefoil) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Sonja L. Reeves
Year Published: 2008
Type: Document
Synthesis

Measuring effectiveness of three postfire hillslope erosion barrier treatments, western Montana, USA

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

Charcoal and carbon storage in forest soils of the Rocky Mountain West

Charcoal represents a super-passive form of carbon (C) that is generated during fire events and is one of the few legacies of fire recorded in the soil profile; however, the importance of this material as a form of C storage has received only limited scientific attention. Here, we review the formation of charcoal in temperate and...

Author(s): Thomas H. DeLuca, Gregory H. Aplet
Year Published: 2008
Type: Document
Book or Chapter or Journal Article, Synthesis

Surface fuel litterfall and decomposition in the Northern Rocky Mountains, U.S.A.

Surface fuel deposition and decomposition rates are important to fire management and research because they can define the longevity of fuel treatments in time and space and they can be used to design, build, test, and validate complex fire and ecosystem models useful in evaluating management alternatives. We determined rates of...

Author(s): Robert E. Keane
Year Published: 2008
Type: Document
Technical Report or White Paper

Climate change effects on historical range and variability of two large landscapes in western Montana, USA

Quantifying the historical range and variability of landscape composition and structure using simulation modeling is becoming an important means of assessing current landscape condition and prioritizing landscapes for ecosystem restoration. However, most simulated time series are generated using static climate conditions which fail...
Carex rostrata, Carex utriculata (swollen beaked sedge, Northwest Territory sedge)
www.nrfirescience.org/resource/10595
This FEIS species review synthesizes information on the relationship of Carex rostrata, Carex utriculata (swollen beaked sedge, Northwest Territory sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the...
Author(s): Michelle B. Anderson
Year Published: 2008
Type: Document
Synthesis

Long-term relations among fire, fuel, and climate in the north-western US based on lake-sediment studies
www.nrfirescience.org/resource/8202
Pollen and high-resolution charcoal records from the north-western USA provide an opportunity to examine the linkages among fire, climate, and fuels on multiple temporal and spatial scales. The data suggest that general charcoal levels were low in the late-glacial period and increased steadily through the last 11 000 years with...
Author(s): Cathy L. Whitlock, Jennifer R. Marlon, Christy E. Briles, Andrea R. Brunelle, Colin J. Long, Patrick J. Bartlein
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Sambucus racemosa (red elderberry)
www.nrfirescience.org/resource/10654
This FEIS species review synthesizes information on the relationship of Sambucus racemosa (red elderberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...
Author(s): Janet L. Fryer
Year Published: 2008
Type: Document
Synthesis

Landscape heterogeneity following large fires: insights from Yellowstone National Park, USA
www.nrfirescience.org/resource/8198
We characterised the remarkable heterogeneity following the large, severe fires of 1988 in Yellowstone National Park (YNP), in the northern Rocky Mountains, Wyoming, USA, by focussing on spatial variation in post-fire structure, composition and ecosystem function at broad, meso, and fine scales. Ecological heterogeneity at multiple...
Author(s): Tania L. Schoennagel, Erica A. H. Smithwick, Monica G. Turner
Year Published: 2008
Type: Document
Book or Chapter or Journal Article
Spatial characteristics of fire severity in relation to fire growth in a Rocky Mountain subalpine forest

We compared the spatial characteristics of fire severity patches within individual fire "runs" (contiguous polygons burned during a given day) resulting from a 72,000 ha fire in central Idaho in 1994. Our hypothesis was that patch characteristics of four fire severity classes (high, moderate, low, and unburned), as captured by five...

Author(s): Calvin A. Farris, Ellis Q. Margolis, John A. Kupfer
Year Published: 2008
Type: Document
Conference Proceedings, Technical Report or White Paper

Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States

Many natural resource agencies and organizations recognize the importance of fuel treatments as tools for reducing fire hazards and restoring ecosystems. However, there continues to be confusion and misconception about fuel treatments and their implementation and effects in fire-prone landscapes across the United States. This paper...

Author(s): Elizabeth D. Reinhardt, Robert E. Keane, David E. Calkin, Jack D. Cohen
Year Published: 2008
Type: Document
Book or Chapter or Journal Article, Synthesis

Rangifer tarandus (caribou)

This FEIS species review synthesizes information on the relationship of Rangifer tarandus (caribou) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Peggy Luensmann
Year Published: 2007
Type: Document
Synthesis

CCE fire regimes and their management

A spectacular forest in the center of the Crown of the Continent Ecosystem (CCE) cuts a 15- by 5-km swath along the Flathead River's South Fork around Big Prairie in the middle of the Bob Marshall Wilderness Area in Montana (Figure 13- 1). This wide valley bottom, which contains two patches (of about 1,000 ha each) of the last...

Author(s): Robert E. Keane, Carl H. Key
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Ten-year responses of ponderosa pine growth, vigor, and recruitment to restoration treatments in the Bitterroot Mountains, Montana, USA

Little is known about ponderosa pine forest ecosystem responses to restoration practices in the
Northern Rocky Mountains, USA. In this study, restoration treatments aimed at approximating historical forest structure and disturbances included modified single-tree selection cutting, with and without prescribed burning. We compared the...

Author(s): Alex Fajardo, Jon Graham, John M. Goodburn, Carl E. Fiedler
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Testing the modeled effectiveness of an operational fuel reduction treatment in a small western Montana interface landscape using two spatial scales

www.nrfirescience.org/resource/8410

Much of the coniferous zones in the Western United States where fires were historically frequent have seen large increases in stand densities and associated forest fuels due to 20th century anthropogenic influences. This condition is partially responsible for contemporary large, uncharacteristically severe wildfires. Therefore,...

Author(s): Michael G. Harrington, Erin Noonan-Wright, Mitchell Doherty
Year Published: 2007
Type: Document
Conference Proceedings

First-year post-fire erosion rates in Bitterroot National Forest, Montana

www.nrfirescience.org/resource/8169

Accelerated runoff and erosion commonly occur following forest fires due to combustion of protective forest floor material, which results in bare soil being exposed to overland flow and raindrop impact, as well as water repellent soil conditions. After the 2000 Valley Complex Fires in the Bitterroot National Forest of west-central...

Author(s): Kevin M. Spigel, Peter R. Robichaud
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Evaluation of a post-fire tree mortality model for western USA conifers

www.nrfirescience.org/resource/8364

Accurately predicting fire-caused mortality is essential to developing prescribed fire burn plans and post-fire salvage marking guidelines. The mortality model included in the commonly used USA fire behaviour and effects models, the First Order Fire Effects Model (FOFEM), BehavePlus, and the Fire and Fuels Extension to the Forest...

Author(s): Sharon M. Hood, Charles W. McHugh, Kevin C. Ryan, Elizabeth D. Reinhardt, Sheri L. Smith
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Effects of alternative treatments on canopy fuel characteristics in five conifer stands

www.nrfirescience.org/resource/11129

A detailed study of canopy fuel characteristics in five different forest types provided a unique dataset for simulating the effects of various stand manipulation treatments on canopy fuels. Low thinning, low thinning with commercial dbh limit, and crown thinning had similar effects on canopy bulk density (CBD) and canopy fuel load (...)

Author(s): Joe H. Scott, Elizabeth D. Reinhardt
Year Published: 2007
Type: Document
**Fragaria vesca (woodland strawberry)**

www.nrfirescience.org/resource/10802

This FEIS species review synthesizes information on the relationship of Fragaria vesca (woodland strawberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...

Author(s): Gregory T. Munger
Year Published: 2007
Type: Document

**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

**Mertensia paniculata (tall bluebells)**

www.nrfirescience.org/resource/10821

This FEIS species review synthesizes information on the relationship of Mertensia paniculata (tall bluebells) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...

Author(s): Sonja L. Reeves
Year Published: 2007
Type: Document

**Predicted fire behavior in selected mountain pine beetle-infested lodgepole pine**

www.nrfirescience.org/resource/12113

Using custom fuel models developed for use with Rothermel's surface fire spread model, we predicted and compared fire behavior in lodgepole pine (Pinus contorta Dougl. var. latifolia Engelm.) stands with endemic, current epidemic, and postepidemic mountain pine beetle (Dendroctonus ponderosae Hopkins) populations using standardized...

Author(s): Wesley G. Page, Michael J. Jenkins
Year Published: 2007
Type: Document

**Lynx canadensis (Canada lynx)**

www.nrfirescience.org/resource/10897

This FEIS species review synthesizes information on the relationship of Lynx canadensis (Canada lynx)
to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Elena D. Ulev
Year Published: 2007
Type: Document
Synthesis

Assessing post-fire Douglas-fir mortality and Douglas-fir beetle attacks in the Northern Rocky Mountains
www.nrfirescience.org/resource/11126
Douglas-fir has life history traits that greatly enhance resistance to injury from fire, thereby increasing post-fire survival rates. Tools for predicting the probability of tree mortality following fire are important components of both pre-fire planning and post-fire management efforts. Using data from mixed-severity wildfire in...
Author(s): Sharon M. Hood, Barbara J. Bentz, Ken E. Gibson, Kevin C. Ryan, Gregg DeNitto
Year Published: 2007
Type: Document
Technical Report or White Paper

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

Poa bulbosa (bulbous bluegrass)
www.nrfirescience.org/resource/10682
This FEIS species review synthesizes information on the relationship of Poa bulbosa (bulbous bluegrass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Corey L. Gucker
Year Published: 2007
Type: Document
Synthesis

Martes pennanti (fisher)
www.nrfirescience.org/resource/10796
This FEIS species review synthesizes information on the relationship of Martes pennanti (fisher) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Rachelle Meyer
Year Published: 2007
Type: Document
**Emissions of levoglucosan, methoxy phenols, and organic acids from prescribed burns, laboratory combustion of wildland fuels, and residential wood combustion**

[www.nrfirescience.org/resource/11426](www.nrfirescience.org/resource/11426)

Biomass combustion emissions make a significant contribution to the overall particulate pollution in the troposphere. Wildland or prescribed burns and residential wood combustion emissions can vary due to differences in fuel, season, time of day, and the nature of the combustion. Inadequate understanding of the relevance of these...

Author(s): Lynn R. Mazzoleni, Barbara Zielinska, Hans Moosmuller
Year Published: 2007
Type: Document

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**Geranium bicknellii (Bicknell's geranium)**

[www.nrfirescience.org/resource/10817](www.nrfirescience.org/resource/10817)

This FEIS species review synthesizes information on the relationship of Geranium bicknellii (Bicknell's geranium) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Sonja L. Reeves
Year Published: 2007
Type: Document

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**Linum lewisii (Lewis flax)**

[www.nrfirescience.org/resource/10815](www.nrfirescience.org/resource/10815)

This FEIS species review synthesizes information on the relationship of Linum lewisii (Lewis flax) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Sonja L. Reeves
Year Published: 2007
Type: Document

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**Home range size of Black-backed Woodpeckers in burned forests of southwestern Idaho**

[www.nrfirescience.org/resource/11416](www.nrfirescience.org/resource/11416)

We examined home range size of Black-backed Woodpeckers (Picoides arcticus) in burned ponderosa pine (Pinus ponderosa) / Douglas-fir (Pseudotsuga menziesii) forests of southwestern Idaho during 2000 and 2002 (6 and 8 years following fire). Home range size for 4 adult males during the post-fledging period was 115.6-420.9 ha using the...

Author(s): Jonathan G. Dudley, Victoria A. Saab
Year Published: 2007
Type: Document

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**Fire, fuels and restoration of ponderosa pine-Douglas fir forests in the Rocky Mountains, USA**

[www.nrfirescience.org/resource/8223](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...

The relation between tree burn severity and forest structure in the Rocky Mountains www.nrfirescience.org/resource/11987

Many wildfire events have burned thousands of hectares across the western United States, such as the Bitterroot (Montana), Rodeo-Chediski (Arizona), Hayman (Colorado), and Biscuit (Oregon) fires. These events led to Congress enacting the Healthy Forest Restoration Act of 2003, which, with other policies, encourages federal and state...

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...)

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...

Development and evaluation of the photoload sampling technique www.nrfirescience.org/resource/11204

Wildland fire managers need better estimates of fuel loading so they can accurately predict potential fire behavior and effects of alternative fuel and ecosystem restoration treatments. This report presents the development and evaluation of a new fuel sampling method, called the photoload sampling technique, to quickly and...
Pyrola asarifolia (pink wintergreen)
www.nrfirescience.org/resource/10668
This FEIS species review synthesizes information on the relationship of Pyrola asarifolia (pink wintergreen) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...
Author(s): Corey L. Gucker
Year Published: 2007
Type: Document
Synthesis

Betula glandulosa (bog birch)
www.nrfirescience.org/resource/10740
This FEIS species review synthesizes information on the relationship of Betula glandulosa (bog birch) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Jennifer E. Tollefson
Year Published: 2007
Type: Document
Synthesis

Neotoma cinerea (bushy-tailed woodrat)
www.nrfirescience.org/resource/10902
This FEIS species review synthesizes information on the relationship of Neotoma cinerea (bushy-tailed woodrat) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Elena D. Ulev
Year Published: 2007
Type: Document
Synthesis

Post-fire burn severity and vegetation response following eight large wildfires across the western United States
www.nrfirescience.org/resource/8168
Vegetation response and burn severity were examined following eight large wildfires that burned in 2003 and 2004: two wildfires in California chaparral, two each in dry and moist mixed-conifer forests in Montana, and two in boreal forests in interior Alaska. Our research objectives were: 1) to characterize one year post-fire...
Author(s): Leigh B. Lentile, Penelope Morgan, Andrew T. Hudak, Michael J. Bobbitt, Sarah A. Lewis, Alistair M. S. Smith, Peter R. Robichaud
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Managing forest structure and fire hazard - A tool for planners
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

Predicting postfire Douglas-fir beetle attacks and tree mortality in the Northern Rocky Mountains

Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) were monitored for 4 years following three wildfires. Logistic regression analyses were used to develop models predicting the probability of attack by Douglas-fir beetle (Dendroctonus pseudotsugae Hopkins, 1905) and the probability of Douglas-fir mortality within 4 years following...

Author(s): Sharon M. Hood, Barbara J. Bentz
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Strix nebulosa (great gray owl)

This FEIS species review synthesizes information on the relationship of Strix nebulosa (great gray owl) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Elena D. Ulev
Year Published: 2007
Type: Document
Synthesis

The photoload sampling technique: estimating surface fuel loadings from downward-looking photographs of synthetic fuelbeds

Fire managers need better estimates of fuel loading so they can more accurately predict the potential fire behavior and effects of alternative fuel and ecosystem restoration treatments. This report presents a new fuel sampling method, called the photoload sampling technique, to quickly and accurately estimate loadings for six common...

Author(s): Robert E. Keane, Laura J. Dickinson
Year Published: 2007
Type: Document
Technical Report or White Paper

Arctostaphylos patula (greenleaf manzanita)

This FEIS species review synthesizes information on the relationship of Arctostaphylos patula (greenleaf manzanita) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Simulation of long-term landscape-level fuel treatment effects on large wildfires
www.nrfirescience.org/resource/8166
A simulation system was developed to explore how fuel treatments placed in topologically random and optimal spatial patterns affect the growth and behaviour of large fires when implemented at different rates over the course of five decades. The system consisted of a forest and fuel dynamics simulation module (Forest Vegetation...)

Comparison of fire scars, fire atlases, and satellite data in the northwestern United States
www.nrfirescience.org/resource/11427
We evaluated agreement in the location and occurrence of 20th century fires recorded in digital fire atlases with those inferred from fire scars that we collected systematically at one site in Idaho and from existing fire-scar reconstructions at four sites in Washington. Fire perimeters were similar for two of three 20th century...

Stand and fuel treatments for restoring old-growth ponderosa pine forests in the interior west (Boise Basin Experimental Forest) - Final report to the Joint Fire Science Program
www.nrfirescience.org/resource/13105
Fire exclusion, especially in the dry forests (i.e. those dominated or potentially dominated by ponderosa pine) has most often altered tree and shrub composition and structure and, though often overlooked in many locales, the forest floor from conditions that occurred historically (pre-1900). When fires are excluded...

Hieracium albiflorum (white hawkweed)
www.nrfirescience.org/resource/10816
This FEIS species review synthesizes information on the relationship of Hieracium albiflorum (white hawkweed) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology...
**Salix discolor (pussy willow)**

www.nrfirescience.org/resource/10679

This FEIS species review synthesizes information on the relationship of Salix discolor (pussy willow) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Corey L. Gucker  
Year Published: 2007  
Type: Document  
Synthesis

**Symphoricarpos occidentalis (western snowberry)**

www.nrfirescience.org/resource/10698

This FEIS species review synthesizes information on the relationship of Symphoricarpos occidentalis (western snowberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution,...

Author(s): Alan S. Hauser  
Year Published: 2007  
Type: Document  
Synthesis

**Free selection: a silvicultural option**

www.nrfirescience.org/resource/12133

Forest management objectives continue to evolve as the desires and needs of society change. The practice of silviculture has risen to the challenge by supplying silvicultural methods and systems to produce desired stand and forest structures and compositions to meet these changing objectives. For the most part, the practice of...

Author(s): Russell T. Graham, Theresa B. Jain, Jonathan Sandquist  
Year Published: 2007  
Type: Document  
Conference Proceedings, Technical Report or White Paper

**The fire-climate connection**

www.nrfirescience.org/resource/11985

JFSP-funded research is exploring and quantifying relationships among the large-scale drivers of climate and the occurrence and extent of wildfire in the various regions of the western United States.

Author(s): Gail Wells  
Year Published: 2007  
Type: Document  
Research Brief or Fact Sheet

**Effects of fire exclusion on forest structure and composition in unlogged ponderosa pine/Douglas-fir forests**

www.nrfirescience.org/resource/7928

Research to date on effects of fire exclusion in ponderosa pine (Pinus ponderosa) forests has been limited by narrow geographical focus, by confounding effects due to prior logging at research sites, and by uncertainty from using reconstructions of past conditions to infer changes. For the work presented here, reference stands in...

Author(s): Eric G. Keeling, Anna Sala, Thomas H. DeLuca
Financial analysis of fuel treatments on national forests in the Western United States

The purpose of this note is to provide a starting point for discussion of fire hazard reduction treatments that meet the full range of management objectives, including budget priorities. Thoughtful design requires an understanding not only of the physical and biological outcomes, but also the costs and potential revenues of applying...

Author(s): Roger D. Fight, R. James Barbour
Year Published: 2006
Type: Document
Research Brief or Fact Sheet

Juniperus horizontalis (creeping juniper)

This FEIS species review synthesizes information on the relationship of Juniperus horizontalis (creeping juniper) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Corey L. Gucker
Year Published: 2006
Type: Document
Synthesis

Gymnorhinus cyanocephalus (pinyon jay)

This FEIS species review synthesizes information on the relationship of Gymnorhinus cyanocephalus (pinyon jay) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...

Author(s): Elena D. Ulev
Year Published: 2006
Type: Document
Synthesis

Snag longevity in relation to wildfire and postfire salvage logging

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

Vulpia microstachys (small sixweeks grass)

www.nrfirescience.org/resource/10709
This FEIS species review synthesizes information on the relationship of Vulpia microstachys (small sixweeks grass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Janet L. Howard
Year Published: 2006
Type: Document
Synthesis

Empirical analyses of plant-climate relationships for the western United States
www.nrfirescience.org/resource/11512
The Random Forests multiple-regression tree was used to model climate profiles of 25 biotic communities of the western United States and nine of their constituent species. Analyses of the communities were based on a gridded sample of ca. 140,000 points, while those for the species used presence-absence data from ca. 120,000...

Author(s): Gerald E. Rehfeldt, Nicholas L. Crookston, Marcus V. Warwell, Jeffrey S. Evans
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

The relation between forest structure and soil burn severity
www.nrfirescience.org/resource/10978
A study funded through National Fire Plan evaluates the relation between pre-wildfire forest structure and post-wildfire soil burn severity across three forest types: dry, moist, and cold forests. Over 73 wildfires were sampled in Idaho, Oregon, Montana, Colorado, and Utah, which burned between 2000 and 2003. Because of the study's...

Author(s): Theresa B. Jain, Russell T. Graham, David S. Pilliod
Year Published: 2006
Type: Document
Conference Proceedings

Perisoreus canadensis (gray jay)
www.nrfirescience.org/resource/10901
This FEIS species review synthesizes information on the relationship of Perisoreus canadensis (gray jay) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Elena D. Ulev
Year Published: 2006
Type: Document
Synthesis

Prediction and measurement of thermally induced cambial tissue necrosis in tree stems
www.nrfirescience.org/resource/7949
A model for fire-induced heating in tree stems is linked to a recently reported model for tissue necrosis. The combined model produces cambial tissue necrosis predictions in a tree stem as a function of heating rate, heating time, tree species, and stem diameter. Model accuracy is evaluated by comparison with experimental...

Author(s): Joshua L. Jones, Brent W. Webb, Bret W. Butler, Matthew B. Dickinson, Daniel M. Jimenez, James J. Reardon, Anthony S. Bova
Year Published: 2006
Estimation of biophysical characteristics for highly variable mixed-conifer stands using small-footprint lidar
www.nrfirescience.org/resource/8254
Although lidar data are widely available from commercial contractors, operational use in North America is still limited by both cost and the uncertainty of large-scale application and associated model accuracy issues. We analyzed whether small-footprint lidar data obtained from five noncontiguous geographic areas with varying...
Author(s): Jennifer L. Rooker Jensen, Karen S. Humes, Tamara Conner, Christopher Jason Williams, John DeGroot
Year Published: 2006
Type: Document

Integrating fuel treatments into comprehensive ecosystem management
www.nrfirescience.org/resource/10973
To plan fuel treatments in the context of comprehensive ecosystem management, forest managers must meet multiple-use and environmental objectives, address administrative and budget constraints, and reconcile performance measures from multiple policy directives. We demonstrate a multiple criteria approach to measuring success of fuel...
Author(s): Kevin D. Hyde, J. Greg Jones, Robin P. Silverstein, Keith Stockmann, Dan R. Loeffler
Year Published: 2006
Type: Document

Zigadenus venenosus (meadow deathcamas)
www.nrfirescience.org/resource/10704
This FEIS species review synthesizes information on the relationship of Zigadenus venenosus (meadow deathcamas) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Alan S. Hauser
Year Published: 2006
Type: Document

Accuracy and precision of two indirect methods for estimating canopy fuels
www.nrfirescience.org/resource/11036
We compared the accuracy and precision of digital hemispherical photography and the LI-COR LAI-2000 plant canopy analyzer as predictors of canopy fuels. We collected data on 12 plots in western Montana under a variety of lighting and sky conditions, and used a variety of processing methods to compute estimates. Repeated measurements...
Author(s): Abran Steele-Feldman, Elizabeth D. Reinhardt, Russell A. Parsons
Year Published: 2006
Type: Document

Fire exclusion and nitrogen mineralization in low elevation forests of western Montana
Little is known regarding how fire exclusion influences nitrogen (N) cycling in low elevation forests of western Montana. Nor is it clear how the change in fire frequency that has resulted from forest management has influenced ecosystem function in terms of plant-soil-microbe interactions. A fire chronosequence approach was used to...

Author(s): M. Derek MacKenzie, Thomas H. DeLuca, Anna Sala
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

**Apocynum cannabinum (Indianhemp)**

This FEIS species review synthesizes information on the relationship of Apocynum cannabinum (Indianhemp) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Sonja L. Reeves
Year Published: 2006
Type: Document
Synthesis

**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**

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

**Frequent fire alters nitrogen transformations in ponderosa pine stands of the inland Northwest**

Recurrent, low-severity fire in ponderosa pine (Pinus ponderosa)/interior Douglas-fir (Pseudotsuga menziesii var. glauca) forests is thought to have directly influenced nitrogen (N) cycling and availability. However, no studies to date have investigated the influence of natural fire intervals on soil processes in undisturbed forests...

Author(s): Thomas H. DeLuca, Anna Sala
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

**Acer grandidentatum (bigtooth maple)**

This FEIS species review synthesizes information on the relationship of Acer grandidentatum (bigtooth maple) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,....

Author(s): Jennifer E. Tollefson
 Modeling fuel treatment costs on Forest Service lands in the western United States

This report intends to increase the accuracy of cost data available for planning and prioritizing fuel management in national forests. A survey of fire management officers was used to develop regression models that may be used to estimate the cost of hazardous fuel reduction treatments. The model was based on the USDA Forest Service...

Author(s): David E. Calkin, Krista M. Gebert
Year Published: 2006
Type: Document
Book or Chapter or Journal Article, Synthesis

 Rosa arkansana (prairie rose)

This FEIS species review synthesizes information on the relationship of Rosa arkansana (prairie rose) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

 Cercocarpus ledifolius (curlleaf mountain-mahogany)

This FEIS species review synthesizes information on the relationship of Cercocarpus ledifolius (curlleaf mountain-mahogany) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution,....

Author(s): Corey L. Gucker
Year Published: 2006
Type: Document
Synthesis

 Carex filifolia (threadleaf sedge)

This FEIS species review synthesizes information on the relationship of Carex filifolia (threadleaf sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,....

Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

 Ponderosa pine ecosystems

This FEIS species review synthesizes information on the relationship of Ponderosa pine ecosystems to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,....

Author(s): Corey L. Gucker
Year Published: 2006
Type: Document
Synthesis
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

Interactions among fire, insects, and pathogens in coniferous forests of the interior western United States and Canada
www.nrfirescience.org/resource/8120
Natural and recurring disturbances caused by fire, native forest insects and pathogens have interacted for millennia to create and maintain forests dominated by seral or pioneering species of conifers in the interior regions of the western United States and Canada. Changes in fire suppression and other factors in the last century...

Author(s): Thomas J. Parker, Karen M. Clancy, Robert L. Mathiasen
Year Published: 2006
Type: Document
Book or Chapter or Journal Article, Synthesis

Carex aquatilis (leafy tussock sedge)
www.nrfirescience.org/resource/10693
This FEIS species review synthesizes information on the relationship of Carex aquatilis (leafy tussock sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...

Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

Foliar nitrogen patterns following stand-replacing fire in lodgepole pine (Pinus contorta var. latifolia) forests of the Rocky Mountains, USA
www.nrfirescience.org/resource/8268
Little previous work has been conducted on effects of natural, high-severity wildfires on nitrogen (N) dynamics. We measured aboveground plant biomass, foliar N, and net N mineralization 2 years after stand-replacing fires in lodgepole pine (Pinus contorta var. latifolia) forests in Grand Teton National Park, Wyoming, USA. We...

Author(s): Kristine L. Metzger, William H. Romme, Monica G. Turner
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Intermountain region wood utilization and wood energy application program
www.nrfirescience.org/resource/8180
ANNOTATION: In 1978 the U.S. Forest Service initiated a National Wood Utilization and Wood Energy Application Program to focus attention on application of existing and developing technology. In this paper, the mission and goals of this program are discussed. Additionally, problems such as access, economic feasibility, and long-term...

Author(s): Dan R. Loeffler, David E. Calkin, Robin P. Silverstein
Vulpia myuros (rattail sixweeks grass)
www.nrfirescience.org/resource/10460
This FEIS species review synthesizes information on the relationship of Vulpia myuros (rattail sixweeks grass) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...
Author(s): Janet L. Howard
Year Published: 2006
Type: Document
Synthesis

Cercocarpus montanus (true mountain-mahogany)
www.nrfirescience.org/resource/10673
This FEIS species review synthesizes information on the relationship of Cercocarpus montanus (true mountain-mahogany) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Corey L. Gucker
Year Published: 2006
Type: Document
Synthesis

Berberis repens (Oregon grape)
www.nrfirescience.org/resource/10905
This FEIS species review synthesizes information on the relationship of Berberis repens (Oregon grape) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Elena D. Ulev
Year Published: 2006
Type: Document
Synthesis

Vulpia octoflora (sixweeks grass)
www.nrfirescience.org/resource/10710
This FEIS species review synthesizes information on the relationship of Vulpia octoflora (sixweeks grass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Janet L. Howard
Year Published: 2006
Type: Document
Synthesis

Comparison of crown fire modeling systems used in three fire management applications
www.nrfirescience.org/resource/11200
The relative behavior of surface-crown fire spread rate modeling systems used in three fire management applications—CFIS (Crown Fire Initiation and Spread), FlamMap and NEXUS—is compared using fire environment characteristics derived from a dataset of destructively measured canopy fuel and associated stand characteristics. Although...

Author(s): Joe H. Scott
Year Published: 2006
Type: Document
Technical Report or White Paper

Fire history of western Montana forested landscapes via tree-ring analyses
www.nrfirescience.org/resource/13363
Wildfire is a natural process that plays an important role in creating, shaping, and maintaining the forests, woodlands, and grasslands of our physical environment (Swetnam et al. 1999). Most forested landscapes require periodic fire to maintain the overall health of their ecosystems. Wildfires...

Author(s): Henri D. Grissino-Mayer, Christopher M. Gentry, Steve Croy, John Hiatt, Ben Osborne, Amanda Stan, Georgina DeWeese Wight
Year Published: 2006
Type: Document
Technical Report or White Paper

Geum triflorum (prairie smoke)
www.nrfirescience.org/resource/10801
This FEIS species review synthesizes information on the relationship of Geum triflorum (prairie smoke) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Gregory T. Munger
Year Published: 2006
Type: Document
Synthesis

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
Research Brief or Fact Sheet

Goodyera oblongifolia (western rattlesnake plantain)
www.nrfirescience.org/resource/10820
This FEIS species review synthesizes information on the relationship of Goodyera oblongifolia (western rattlesnake plantain) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution...

Author(s): Sonja L. Reeves
Year Published: 2006
Type: Document
Wildlife and invertebrate response to fuel reduction treatments in dry coniferous forests of the Western United States: a synthesis

www.nrfirescience.org/resource/11192

This paper synthesizes available information on the effects of hazardous fuel reduction treatments on terrestrial wildlife and invertebrates in dry coniferous forest types in the West. We focused on thinning and/or prescribed fire studies in ponderosa pine (Pinus ponderosa) and dry-type Douglas-fir (Pseudotsuga menziesii), lodgepole...

Author(s): David S. Pilliod, Evelyn L. Bull, Jane L. Hayes, Barbara C. Wales
Year Published: 2006
Type: Document
Synthesis, Technical Report or White Paper

Patagioenas fasciata (band-tailed pigeon)

www.nrfirescience.org/resource/10896

This FEIS species review synthesizes information on the relationship of Patagioenas fasciata (band-tailed pigeon) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Elena D. Ulev
Year Published: 2006
Type: Document
Synthesis

History of fire and Douglas-fir establishment in a savanna and sagebrush-grassland mosaic, southwestern Montana, USA

www.nrfirescience.org/resource/7942

Over the past century, trees have encroached into grass- and shrublands across western North America. These include Douglas-fir trees (Pseudotsuga menziesii (Mirb.) Franco var. glauca (Beissn.) Franco) encroaching into mountain big sagebrush Nutt. ssp. vaseyana (Ryd.) Beetle) from stable islands of savanna in southwestern Montana....

Author(s): Emily K. Heyerdahl, Richard F. Miller, Russell A. Parsons
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Calamagrostis montanensis (plains reedgrass)

www.nrfirescience.org/resource/10702

This FEIS species review synthesizes information on the relationship of Calamagrostis montanensis (plains reedgrass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

Calypso bulbosa (fairy slipper)

www.nrfirescience.org/resource/10818
This FEIS species review synthesizes information on the relationship of Calypso bulbosa (fairy slipper) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Sonja L. Reeves
Year Published: 2006
Type: Document
Synthesis

Evaluation of silvicultural treatments and biomass use for reducing fire hazard in western states
www.nrfirescience.org/resource/11189
Several analysis have shown that fire hazard is a concern for substantial areas of forestland, shrubland, grassland, and range in the western United States. In response, broadscale management strategies, such as the National Fire Plan, established actions to reduce the threat of undesirable fire. Available budgets are insufficient...
Year Published: 2006
Type: Document
Technical Report or White Paper

Bromus carinatus var. carinatus, Bromus carinatus var. marginatus (California brome, mountain brome)
www.nrfirescience.org/resource/10893
This FEIS species review synthesizes information on the relationship of Bromus carinatus var. carinatus, Bromus carinatus var. marginatus (California brome, mountain brome) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also...
Author(s): Jennifer E. Tollefson
Year Published: 2006
Type: Document
Synthesis

Rosa woodsii (Wood's rose)
www.nrfirescience.org/resource/10700
This FEIS species review synthesizes information on the relationship of Rosa woodsii (Wood's rose) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

Response of western mountain ecosystems to climatic variability and change: the Western Mountain Initiative
www.nrfirescience.org/resource/8157
Mountain ecosystems within our national parks and other protected areas provide valuable goods and services such as clean water, biodiversity conservation, and recreational opportunities, but their potential responses to expected climatic changes are inadequately understood. The Western Mountain Initiative (WMI) is a collaboration...
Piranga ludoviciana (western tanager)
www.nrfirescience.org/resource/10795
This FEIS species review synthesizes information on the relationship of Piranga ludoviciana (western tanager) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...

Estimating canopy fuel characteristics in five conifer stands in the western United States using tree and stand measurements
www.nrfirescience.org/resource/8128
Assessment of crown fire potential requires quantification of canopy fuels. In this study, canopy fuels were measured destructively on plots in five Interior West conifer stands. Observed canopy bulk density, canopy fuel load, and vertical profiles of canopy fuels are compared with those estimated from stand data using several...

The effects of postfire salvage logging on cavity-nesting birds
www.nrfirescience.org/resource/12933
We investigated the effects of postfire salvage logging on cavity-nesting birds by comparing nest densities and patterns of nest reuse over a three-year period in seven logged and eight unlogged patches of mixed-conifer forest in the Blackfoot-Clearwater Wildlife Management Area, Montana. We found 563 active nests of 18 cavity-...

Adapting the Water Erosion Prediction Project (WEPP) model to forest conditions
www.nrfirescience.org/resource/8433
Adequate and reliable erosion prediction tools are needed for sound forest resources management. Numerous watershed models have been developed during the past. These models, however, are often limited in their applications largely due to their inappropriate representations of the hydrological processes involved. The Water Erosion...
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

Eleocharis palustris (common spikerush)
www.nrfirescience.org/resource/10694
This FEIS species review synthesizes information on the relationship of Eleocharis palustris (common spikerush) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Alan S. Hauser
Year Published: 2006
Type: Document
Synthesis

Amount, position, and age of coarse wood influence litter decomposition in postfire Pinus contorta stands
www.nrfirescience.org/resource/8222
Spatial variation in vegetation and coarse wood is a major source of forest heterogeneity, yet little is known about how this affects ecosystem processes. In 15-year-old postfire lodgepole pine (Pinus contorta var. latifolia Englem.) stands in Yellowstone National Park, Wyoming, we investigated how the decomposition rate varies with...
Author(s): Alysa J. Remsburg, Monica G. Turner
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

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

Timber markets and fuel treatments in the western U.S.
www.nrfirescience.org/resource/7905
ANNOTATION: This paper presents a model of interrelated timber markets in the U.S. West to assess the impacts of large-scale fuel reduction programs on these markets, and concomitant effects of the market on the fuel reduction programs. The model maximizes area treated, given fire regime-condition
Variation in fire regimes of the Rocky Mountains: implications for avian communities and fire management

www.nrfirescience.org/resource/8144

Information about avian responses to fire in the U.S. Rocky Mountains is based solely on studies of crown fires. However, fire management in this region is based primarily on studies of low-elevation ponderosa pine (Pinus ponderosa) forests maintained largely by frequent understory fires. In contrast to both of these trends, most...

Author(s): Victoria A. Saab, Hugh D. W. Powell, Natasha B. Kotliar, Karen R. Newlon
Year Published: 2005
Type: Document
Book or Chapter or Journal Article, Synthesis

Prescribed fire strategies to restore wildlife habitat in ponderosa pine forests of the intermountain west (birds and burns network) - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11400

The goal of this project was to help evaluate the effectiveness of prescribed fire in reducing fuels, and to assess the effects of fuel reduction on habitats and populations of birds in ponderosa pine forests throughout the Interior West. Known as the Birds and Burns Network, we have study areas located on National Forest and The...

Author(s): Victoria A. Saab, William M. Block
Year Published: 2005
Type: Document
Technical Report or White Paper

Testing transferability of willingness to pay for forest fire prevention among three states of California, Florida, and Montana

www.nrfirescience.org/resource/7960

The equivalency of willingness to pay between the states of California, Florida and Montana is tested. Residents in California, Florida and Montana have an average willingness to pay of $417, $305, and $382 for prescribed burning program, and $403, $230, and $208 for mechanical fire fuel reduction program, respectively. Due to wide...

Author(s): John B. Loomis, Le Trong Hung, Armando Gonzalez-Caban
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Nitrogen cycling and spatial heterogeneity following fire and restoration treatments in the ponderosa pine/douglas-fir ecosystem

www.nrfirescience.org/resource/11281

Lower elevation ponderosa pine ecosystems of the Rocky Mountain West (U.S.) historically experienced a frequent, low- intensity fire regime that promoted dominance of large diameter ponderosa pine (Pinus ponderosa). An abrupt change in this historical disturbance regime occurred upon Euro-American settlement of the West in the late...
Characterizing and mapping forest fire fuels using ASTER imagery and gradient modeling
www.nrfirescience.org/resource/7925
Land managers need cost-effective methods for mapping and characterizing forest fuels quickly and accurately. The launch of satellite sensors with increased spatial resolution may improve the accuracy and reduce the cost of fuels mapping. The objective of this research is to evaluate the accuracy and utility of imagery from the...
Author(s): Michael J. Falkowski, Paul E. Gessler, Penelope Morgan, Andrew T. Hudak, Alistair M. S. Smith
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Estimating forest canopy bulk density using six indirect methods
www.nrfirescience.org/resource/7952
Canopy bulk density (CBD) is an important crown characteristic needed to predict crown fire spread, yet it is difficult to measure in the field. Presented here is a comprehensive research effort to evaluate six indirect sampling techniques for estimating CBD. As reference data, detailed crown fuel biomass measurements were taken on...
Author(s): Robert E. Keane, Elizabeth D. Reinhardt, Joe H. Scott, Kathy L. Gray, James J. Reardon
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Apocynum androsaemifolium (spreading dogbane)
www.nrfirescience.org/resource/10666
This FEIS species review synthesizes information on the relationship of Apocynum androsaemifolium (spreading dogbane) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Amy H. Groen
Year Published: 2005
Type: Document
Synthesis

Artemisia ludoviciana (prairie sage)
www.nrfirescience.org/resource/10605
This FEIS species review synthesizes information on the relationship of Artemisia ludoviciana (prairie sage) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...
Author(s): Michelle B. Anderson
Year Published: 2005
Type: Document
Synthesis

Photo series for major natural fuel types of the United States - Phase II -- Progress Report
www.nrfirescience.org/resource/11170
The natural fuels stereo photo series is a collection of geo-referenced data and photographs that display a range of natural conditions, fuel loadings, and other fuelbed characteristics in a wide variety of forest-, woodland-, shrub-, and grass-dominated ecosystem types. The photo series are useful tools for quickly and...

Author(s): Roger D. Ottmar
Year Published: 2005
Type: Document
Technical Report or White Paper

Stereo photo guide for estimating canopy fuel characteristics in conifer stands

www.nrfirescience.org/resource/11199
Stereo photographs, hemispherical photographs, and stand data are presented with associated biomass and canopy fuel characteristics for five Interior West conifer stands. Canopy bulk density, canopy base height, canopy biomass by component, available canopy fuel load, and vertical distribution of canopy fuel are presented for each...

Author(s): Joe H. Scott, Elizabeth D. Reinhardt
Year Published: 2005
Type: Document
Technical Report or White Paper

Landscape fragmentation and forest fuel accumulation: effects of fragment size, age, and climate - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/12115
Landscape fragmentation can affect fuel accumulation, increase the spatial variability of fuel loads, and affect the susceptibility of forests to fire. Fragmentation creates a complex environment in which to manage forests in the United States and Puerto Rico and few studies have related the combined effects of fragmentation,...

Author(s): William A. Gould, Grizelle Gonzalez, Andrew T. Hudak
Year Published: 2005
Type: Document
Technical Report or White Paper

Hypericum perforatum (common St Johnswort)

www.nrfirescience.org/resource/10499
This FEIS species review synthesizes information on the relationship of Hypericum perforatum (common St Johnswort) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species'...

Author(s): Kristin L. Zouhar
Year Published: 2005
Type: Document
Synthesis

Understory recovery after low-and high-intensity fires in northern Idaho ponderosa pine forests

www.nrfirescience.org/resource/11502
Comparisons between unburned sites, low-intensity fires, and high-intensity fires in this ponderosa pine-dominated community indicate that a majority of the species coverages and frequencies are unchanged regardless of burn treatment. Also, a majority of species that were impacted by the fires showed increased coverage and/or...

Author(s): Corey L. Gucker
Year Published: 2005
Dry forests and wildland fires of the inland Northwest USA: contrasting the landscape ecology of the pre-settlement and modern eras

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
Year Published: 2005
Type: Document
Book or Chapter or Journal Article, Synthesis

Juncus balticus (Baltic rush)

This FEIS species review synthesizes information on the relationship of Juncus balticus (Baltic rush) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Alan S. Hauser
Year Published: 2005
Type: Document
Synthesis

Quantitative comparison of spectral indices and transformations of multi-resolution remotely sensed data using ground measurements: implications for fire severity modeling - Final Report to the Joint Fire Science Program

The primary factor in estimating fire danger is fuel moisture. Fuel moisture varies seasonally and should be measured over an entire fire season using remote sensing technologies and verified using ground measurements. Recent advances in spaceborne and airborne imaging systems can potentially significantly improve the ability to...

Author(s): Jennifer L. Rechel, Dar A. Roberts
Year Published: 2005
Type: Document
Technical Report or White Paper

Lonicera fragrantissima, Lonicera maackii, Lonicera morrowii, Lonicera tatarica, Lonicera x bella, Lonicera xylosteum (winter honeysuckle, Amur honeysuckle, Morrow's honeysuckle, Tatarian honeysuckle, Bell's honeysuckle, European fly honeysuckle)

This FEIS species review synthesizes information on the relationship of Lonicera fragrantissima, Lonicera maackii, Lonicera morrowii, Lonicera tatarica, Lonicera x bella, Lonicera xylosteum (winter honeysuckle, Amur honeysuckle, Morrow's honeysuckle, Tatarian honeysuckle, Bell's honeysuckle, European fly honeysuckle) to fire--how...

Author(s): Gregory T. Munger
Year Published: 2005
Type: Document
Synthesis
Five-year operational trial of verbenone to deter mountain pine beetle (Dendroctonus ponderosae; Coleoptera: Scolytidae) attack of lodgepole pine (Pinus contorta)

The antiaggregation pheromone verbenone was operationally tested for 5 yr to deter mass attack by the mountain pine beetle on lodgepole pine in campgrounds and administrative areas surrounding Redfish and Little Redfish Lakes at the Sawtooth National Recreation Area in central Idaho. Each year, five-gram verbenone pouches were...

Author(s): Robert Progar
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Cytisus scoparius, Cytisus striatus (Scotch broom, Portuguese broom)

This FEIS species review synthesizes information on the relationship of Cytisus scoparius, Cytisus striatus (Scotch broom, Portuguese broom) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also...

Author(s): Kristin L. Zouhar
Year Published: 2005
Type: Document
Synthesis

Restoring dry and moist forests of the inland northwestern U. S.

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

A web-based information system for estimating fuel characteristics, fire hazard, and treatment effectiveness - Final Report to the Joint Fire Science Program

This project has three objectives: 1) Classify ponderosa pine, Douglas-fir, and dry mixed-conifer forests types in Montana and New Mexico into appropriate fuel characteristic classes (FCC's), and display the results by forest type, density, and structural classes, 2) Develop web-based applications by which users can evaluate the...

Author(s): Carl E. Fiedler, Roger D. Ottmar
Year Published: 2005
Type: Document
Technical Report or White Paper

Impacts of prescribed burning on the survival of Douglas-fir and Ponderosa pine in the Boise National Forest - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/7903

www.nrfirescience.org/resource/10488

www.nrfirescience.org/resource/11879

www.nrfirescience.org/resource/11399
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

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
Conference Proceedings, Synthesis

Clintonia uniflora (queencup beadlily)
www.nrfirescience.org/resource/10798
This FEIS species review synthesizes information on the relationship of Clintonia uniflora (queencup beadlily) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Rachelle Meyer
Year Published: 2005
Type: Document
Synthesis

Demonstration and integration of systems for fire remote sensing, ground-based fire measurement, and fire modeling - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11158
Proof-of-concept research is being conducted to: compare airborne and in situ, ground-based fire measurement systems; begin evaluation of two fire-behavior simulation models with these data; test approaches to incorporating improved wind-field and weather data in these models; test the utility of the airborne remote sensing for...
Author(s): Colin C. Hardy, Philip J. Riggan
Year Published: 2005
Type: Document
Technical Report or White Paper
Cornus nuttallii (Pacific dogwood)
www.nrfirescience.org/resource/10681
This FEIS species review synthesizes information on the relationship of Cornus nuttallii (Pacific dogwood) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...
Author(s): Corey L. Gucker
Year Published: 2005
Type: Document
Synthesis

Climate drivers of fire and fuel in the Northern Rockies: past, present & future - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11154
This 3-year research project is identifying the climate drivers of regional fire and fuel dynamics in the Northern Rockies in the past, present, and future. We are identifying regional fire years from two sources: multicentury tree-ring reconstructions and multidecadal fire atlases. To elucidate the climate forcing of past fires, we...
Author(s): Penelope Morgan, Emily K. Heyerdahl, Carol Miller, Matthew G. Rollins
Year Published: 2005
Type: Document
Technical Report or White Paper

Home range size and foraging habitat of Black-backed Woodpeckers
www.nrfirescience.org/resource/11417
We examined home range size of Black-backed Woodpeckers (Picoides arcticus) in burned ponderosa pine (Pinus ponderosa) / Douglas-fir (Pseudotsuga menziesii) forests of southwestern Idaho during 2000 and 2002 (6 and 8 years following fire). Home range size for 4 adult males during the post-fledging period was 115.6-420.9 ha using the...
Author(s): Jonathan G. Dudley
Year Published: 2005
Type: Document
Dissertation or Thesis

Galium aparine (stickywilly)
www.nrfirescience.org/resource/10677
This FEIS species review synthesizes information on the relationship of Galium aparine (stickywilly) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Corey L. Gucker
Year Published: 2005
Type: Document
Synthesis

Stand establishment and tending in the inland northwest
www.nrfirescience.org/resource/11141
The moist, cold, and dry forests of the Inland Northwest occupy approximately 144 million acres. Ponderosa pine, lodgepole pine, western white pine, western larch, and Douglas-fir are usually the
preferred commercial species of the area. These early-seral species are relatively resistant to endemic levels of insects and diseases.

Author(s): Russell T. Graham, Theresa B. Jain, Phil Cannon
Year Published: 2005
Type: Document
Technical Report or White Paper

Chondrilla juncea (rush skeletonweed)

This FEIS species review synthesizes information on the relationship of Chondrilla juncea (rush skeletonweed) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...

Author(s): Kristin L. Zouhar
Year Published: 2004
Type: Document
Synthesis

Prunus pensylvanica (pin cherry)

This FEIS species review synthesizes information on the relationship of Prunus pensylvanica (pin cherry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...

Author(s): Michelle B. Anderson
Year Published: 2004
Type: Document
Synthesis

Role of fire in determining annual water yield in mountain watersheds

This paper presents the computation procedures for estimating average annual water yields based on annual precipitation and vegetation cover types. This procedures allows for an estimation of water yields under current conditions, under various levels of vegetation management, or under historic water yield based on fire history. Two...

Author(s): Phillip E. Farnes, Ward W. McCaughey, Katherine J. Hansen
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Mountains, fire, fire suppression, and the carbon cycle in the western United States

Most mountain regions in the western United States are covered by forests, which are for the most part recovering from historical harvesting and have been experiencing active fire suppression over approximately the past 100 years (Tilman and others 2000). Whereas many western landscapes are currently perceived as pristine natural...

Author(s): David S. Schimel
Year Published: 2004
Type: Document
Technical Report or White Paper
Leymus ambiguus (Colorado wildrye)
This FEIS species review synthesizes information on the relationship of Leymus ambiguus (Colorado wildrye) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...
Author(s): Michelle B. Anderson
Year Published: 2004
Type: Document
Synthesis

Vascular cambium necrosis in forest fires: using hyperbolic temperature regimes to estimate parameters of a tissue-response model
Hyperbolic temperature exposures (in which the rate of temperature rise increases with time) and an analytical solution to a rate-process model were used to characterise the impairment of respiration in samples containing both phloem (live bark) and vascular-cambium tissue during exposures to temperatures such as those experienced...
Author(s): Matthew B. Dickinson, Joan Jolliff, Anthony S. Bova
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Rhus trilobata (skunkbush sumac)
This FEIS species review synthesizes information on the relationship of Rhus trilobata (skunkbush sumac) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Michelle B. Anderson
Year Published: 2004
Type: Document
Synthesis

The relationship of field burn severity measures to satellite-derived Burned Area Reflectance Classification (BARC) maps
Preliminary results are presented from ongoing research on spatial variability of fire effects on soils and vegetation from the Black Mountain Two and Cooney Ridge wildfires, which burned in western Montana during the 2003 fire season. Extensive field fractional cover data were sampled to assess the efficacy of quantitative...
Author(s): Andrew T. Hudak, Penelope Morgan, Carter Stone, Peter R. Robichaud, Theresa B. Jain, Jess T. Clark
Year Published: 2004
Type: Document
Conference Proceedings

Global warming's unlikely harbingers
The lodgepole pines are dying. Inside the bark of the trees, tens of millions of beetles are tunneling,
birthing, hatching, maturing. In early May, when Forest Service researcher Jesse Logan drives through the Stanley Valley to inspect the damage, more than half the lodgepole pines display dull red foliage - the signal flag of...

Guidelines for restoration and rehabilitation of principal plant communities
www.nrfirescience.org/resource/11121
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...

Analysis of algorithms for predicting canopy fuel
www.nrfirescience.org/resource/10958
We compared observed canopy fuel characteristics with those predicted by existing biomass algorithms. We specifically examined the accuracy of the biomass equations developed by Brown (1978. We used destructively sampled data obtained at 5 different study areas. We compared predicted and observed quantities of foliage and crown...

Postfire seeding for erosion control: effectiveness and impacts on native plant communities
www.nrfirescience.org/resource/7911
Large, high-severity wildfires remove vegetation cover and expose mineral soil, often causing erosion and runoff during postfire rain events to increase dramatically. Land-management agencies in the United States are required to assess site conditions after wildfire and, where necessary, implement emergency watershed rehabilitation...

Forest structure and organic horizon analysis along a fire chronosequence in the low elevation forests of western Montana
www.nrfirescience.org/resource/8271
Although fire consumes much of the forest floor, few studies have examined the change in forest floor characteristics with increasing time since fire. Mixed forests of ponderosa pine (Pinus ponderosa Doug. Ex. laws) and Douglas-fir (Pseudotsuga mensizii (Mirb.) Franco) in the inland northwest once burned with greater frequency than...
Smoke produced from residual combustion

Considerable research has been carried out to estimate the chemical composition and the amount of trace gases and particulate matter emitted during short-duration flaming and smoldering combustion of fuels in the fire-prone forest and grassland ecosystems. For other forest ecosystems, where long-duration residual smoldering...

Author(s): Ronald E. Babbitt, Wei Min Hao
Year Published: 2004
Type: Document
Technical Report or White Paper

Factors influencing occupancy of nest cavities in recently burned forests

Recently burned forests in western North America provide nesting habitat for many species of cavity-nesting birds. However, little is understood about the time frame and the variables affecting occupancy of postfire habitats by these birds. We studied factors influencing the occupancy and reuse of nest cavities from 1-7 years after...

Author(s): Victoria A. Saab, Jonathan G. Dudley, William L. Thompson
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Red Lodge, Montana: steps to improve community preparedness for wildfire

This is a government publication outlining the steps to wildfire preparedness in Red Lodge, MT. The key features include homeowners' associations, which lead in fuel reduction around properties; USFS recreation residences, which conduct fuel reduction projects; evacuation plans and fuel breaks; regulations; and relationships, which...

Author(s): Victoria Sturtevant, Linda E. Kruger
Year Published: 2004
Type: Document
Research Brief or Fact Sheet

Restoring vigor and reducing hazard in an old growth western larch stand (Montana)

Description not entered
Author(s): Carl E. Fiedler, Michael G. Harrington
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Monitoring change in exotic plant abundance after fuel reduction/restoration treatments in ponderosa pine forests of western Montana

Exotic species were monitored following treatments designed to reduce wildfire hazard and initiate restoration of forest structure and process in ponderosa pine (Pinus ponderosa)/Douglas-fir (Pseudotsuga menziesii) forests to compare response among treatments. Treatments included: no treatment (control), prescribed burning,...
Is forest structure related to fire severity? Yes, no, and maybe: methods and insights in quantifying the answer
www.nrfirescience.org/resource/10977
Wildfires in 2000 burned over 500,000 forested ha in the Northern Rocky Mountains. In 2001, National Fire Plan funding became available to evaluate the influence of pre-wildfire forest structure on post wildfire fire severity. Results from this study will provide information on forest structures that are resilient to wildfire. Three...

Temperature-dependent rate models of vascular cambium cell mortality
www.nrfirescience.org/resource/7922
We use two rate-process models to describe cell mortality at elevated temperatures as a means of understanding vascular cambium cell death during surface fires. In the models, cell death is caused by irreversible damage to cellular molecules that occurs at rates that increase exponentially with temperature. The models differ in...

Field validation of Burned Area Reflectance Classification (BARC) products for post fire assessment
www.nrfirescience.org/resource/10972
The USFS Remote Sensing Applications Center (RSAC) and the USGS EROS Data Center (EDC) produce Burned Area Reflectance Classification (BARC) maps for use by Burned Area Emergency Rehabilitation (BAER) teams in rapid response to wildfires. BAER teams desire maps indicative of soil burn severity, but photosynthetic and...

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...
Blue mountain nature trail: a fire story
www.nrfirescience.org/resource/12935
In 2003, on Black Mountain just to the northwest, lightning ignited a wildfire that eventually burned across 7,000 acres ending here at the Blue Mountain Nature Trail. Because of this event, we have a unique chance to observe close-up how fire affects a ponderosa pine and Douglas-fir forest...
Author(s): U.S. Department of Agriculture, Forest Service
Year Published: 2004
Type: Document
Research Brief or Fact Sheet

Postfire management on forested public lands of the western United States
www.nrfirescience.org/resource/7913
Forest ecosystems in the western United States evolved over many millennia in response to disturbances such as wildfires. Land use and management practices have altered these ecosystems, however, including fire regimes in some areas. Forest ecosystems are especially vulnerable to postfire management practices because such practices...
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

The interaction of fire, fuels, and climate across Rocky Mountain forests
www.nrfirescience.org/resource/13583
Understanding the relative influence of fuels and climate on wildfires across the Rocky Mountains is necessary to predict how fires may respond to a changing climate and to define effective fuel management approaches to controlling wildfire in this increasingly populated region. The idea that decades of fire suppression have...
Author(s): Tania L. Schoennagel, Thomas T. Veblen, William H. Romme
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Incorporating wildlife habitat needs into restoration and rehabilitation projects
www.nrfirescience.org/resource/11119
Description not entered
Author(s): Richard Stevens
Year Published: 2004
Type: Document
Technical Report or White Paper

A strategic assessment of crown fire hazard in Montana: potential effectiveness and costs of hazard reduction treatments
www.nrfirescience.org/resource/11181
Estimates of crown fire hazard are presented for existing forest conditions in Montana by density class, structural class, forest type, and landownership. Three hazard reduction treatments were evaluated for their effectiveness in treating historically fire-adapted forests (ponderosa pine (Pinus ponderosa Dougl. ex Laws.), Douglas-...
Sonchus arvensis (perennial sowthistle)
www.nrifirescience.org/resource/10464
This FEIS species review synthesizes information on the relationship of Sonchus arvensis (perennial sowthistle) to fire—how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species’...
Author(s): Jack McWilliams
Year Published: 2004
Type: Document
Synthesis

Thinning and prescribed fire and projected trends in wood product potential, financial return, and fire hazard in Montana
www.nrifirescience.org/resource/11177
This work was undertaken under a joint fire science project ‘Assessing the need, costs, and potential benefits of prescribed fire and mechanical treatments to reduce fire hazard.’ This paper compares the future mix of timber products under two treatment scenarios for the state of Montana. We developed and demonstrated an analytical...
Author(s): R. James Barbour, Roger D. Fight, Glenn A. Christensen, Guy L. Pinjuv, Rao V. Nagubadi
Year Published: 2004
Type: Document
Technical Report or White Paper

Asarum caudatum (wild ginger)
www.nrifirescience.org/resource/10674
This FEIS species review synthesizes information on the relationship of Asarum caudatum (wild ginger) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Corey L. Gucker
Year Published: 2004
Type: Document
Synthesis

Establishment and growth of conifer regeneration following harvest and residue treatments in a western larch-Douglas-fir forest
www.nrifirescience.org/resource/13144
Forest managers often choose prescriptions that promote natural regeneration of various species that differ in relative shade tolerance. Assessing the response of forest vegetation to alternative treatments in the Inland Northwest is challenging, given that the process takes decades to unfold. In this study, conifer regeneration was...
Author(s): Sarah Jane Pierce
Year Published: 2003
Type: Document
Dissertation or Thesis
Across North America, decades of fire suppression and recent patterns of human settlement have combined to increase the risks that wildland fires pose to human life, property, and natural resource values. Various methods can be used to reduce fuel hazards and mitigate these risks, but funding and other constraints require that these...

Author(s): Carol Miller
Year Published: 2003
Type: Document
Conference Proceedings, Technical Report or White Paper

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. These fires increased light and nutrient levels, reduced plant competition, and increased exposure of bare soil. These conditions favor the invasion and expansion of...

Author(s): Elaine Kennedy Sutherland
Year Published: 2003
Type: Document
Conference Proceedings

This FEIS species review synthesizes information on the relationship of Artemisia rigida (stiff sagebrush) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...

Author(s): Jack McWilliams
Year Published: 2003
Type: Document
Synthesis

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...

Author(s): Alisa L. Gallant, Andrew J. Hansen, John S. Councilman, Duane K. Monte, David W. Betz
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

This FEIS species review synthesizes information on the relationship of Schoenocrambe linifolia (flaxleaf plainsmustard) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution,...
Sisymbrium altissimum (tumble mustard)
www.nrfirescience.org/resource/10458
This FEIS species review synthesizes information on the relationship of Sisymbrium altissimum (tumble mustard) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...
Author(s): Janet L. Howard
Year Published: 2003
Type: Document
Synthesis

Effects of thinning and prescribed burning on birds and small mammals
www.nrfirescience.org/resource/11504
Land management agencies are restoring ponderosa pine forests and reducing fuel loads by thinning followed by prescribed burning. However, little is known about how this combination of treatments will affect local wildlife. In this study, I focus on the following short-term wildlife responses: 1) differences in avian and small-...
Author(s): Jennifer Woolf
Year Published: 2003
Type: Document
Dissertation or Thesis

Potentilla recta (sulfur cinquefoil)
www.nrfirescience.org/resource/10497
This FEIS species review synthesizes information on the relationship of Potentilla recta (sulfur cinquefoil) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,...
Author(s): Kristin L. Zouhar
Year Published: 2003
Type: Document
Synthesis

Key issues in fire regime research for fuels management and ecological restoration
www.nrfirescience.org/resource/11025
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...
Author(s): Thomas T. Veblen
Year Published: 2003
Type: Document
Conference Proceedings

Descurainia pinnata (pinnate tansymustard)
www.nrfirescience.org/resource/10723
This FEIS species review synthesizes information on the relationship of Descurainia pinnata (pinnate tansymustard) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Janet L. Howard
Year Published: 2003
Type: Document
Synthesis

Comparing two methods of identifying ecological restoration opportunities
www.nrfirescience.org/resource/8430
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

Descurainia sophia (flixweed tansymustard)
www.nrfirescience.org/resource/10463
This FEIS species review synthesizes information on the relationship of Descurainia sophia (flixweed tansymustard) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species'...
Author(s): Janet L. Howard
Year Published: 2003
Type: Document
Synthesis

Artemisia frigida (fringed sagebrush)
www.nrfirescience.org/resource/10788
This FEIS species review synthesizes information on the relationship of Artemisia frigida (fringed sagebrush) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Jack McWilliams
Year Published: 2003
Type: Document
Synthesis

Climatic controls on fire-induced sediment pulses in Yellowstone National Park and central Idaho: a long-term perspective
www.nrfirescience.org/resource/7962
Fire management addressing postfire erosion and aquatic ecosystems tends to focus on short-term effects persisting up to about a decade after fire. A longer perspective is important in understanding natural variability in postfire erosion and sedimentation, the role of these processes in structuring habitat, and future expectations...
Author(s): Grant A. Meyer, Jennifer L. Pierce
Using digital terrain modeling and satellite imagery to map interactions among fire and forest microbes
www.nrfirescience.org/resource/10989
Behavior and biology of many forest pests are tied to major forest disturbances and succession. Fire is the principal disturbance in the forests of the western United States. Fire regimes as well as distribution and behavior of forest pests and beneficial microbes are all strongly associated with plant communities. Thus, mapping of...
Author(s): Geral I. McDonald, Jeffrey S. Evans, Thomas M. Rice, Eva K. Strand
Year Published: 2003
Type: Document
Conference Proceedings, Technical Report or White Paper

Comparing potential fuel treatment trade-off models: initial results
www.nrfirescience.org/resource/8412
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

Stem mortality in surface fires. Part II: experimental methods for characterizing the thermal response of tree stems to heating by fires
www.nrfirescience.org/resource/10979
Current methods for predicting fire-induced plant mortality in shrubs and trees are largely empirical. These methods do not exhibit a wide range of applicability and are not readily linked to duff burning, soil heating, and surface fire behavior models. A detailed model predicting the temperature distribution through a tree stem as...
Author(s): Daniel M. Jimenez, Bret W. Butler, James J. Reardon
Year Published: 2003
Type: Document
Conference Proceedings

Using simulation to map fire regimes: an evaluation of approaches, strategies, and limitations
www.nrfirescience.org/resource/7951
Spatial depictions of fire regimes are indispensable to fire management because they portray important characteristics of wildland fire, such as severity, intensity, and pattern, across a landscape that serves as important reference for future treatment activities. However, spatially explicit fire regime maps are difficult and...
Author(s): Robert E. Keane, Geoffrey J. Cary, Russell A. Parsons
Year Published: 2003
Type: Document
Book or Chapter or Journal Article
Pinus contorta var. latifolia (Rocky Mountain lodgepole pine)

This FEIS species review synthesizes information on the relationship of Pinus contorta var. latifolia (Rocky Mountain lodgepole pine) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy....

Author(s): Michelle B. Anderson
Year Published: 2003
Type: Document

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

Assessing canopy fuel stratum characteristics in crown fire prone fuel types of western North America

Application of crown fire behavior models in fire management decision-making have been limited by the difficulty of quantitatively describing fuel complexes, specifically characteristics of the canopy fuel stratum. To estimate canopy fuel stratum characteristics of four broad fuel types found in the western United States and...

Author(s): Martin E. Alexander, Ronald H. Wakimoto
Year Published: 2003
Type: Document

Bromus tectorum (cheatgrass)

This FEIS species review synthesizes information on the relationship of Bromus tectorum (cheatgrass) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy....

Author(s): Kristin L. Zouhar
Year Published: 2003
Type: Document

Acer platanoides (Norway maple)

This FEIS species review synthesizes information on the relationship of Acer platanoides (Norway maple) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the
species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy.

Author(s): Gregory T. Munger
Year Published: 2003
Type: Document
Synthesis

A collaborative fire hazard reduction/ecosystem restoration stewardship project in a Montana mixed ponderosa pine/Douglas-fir/western larch wildland-urban interface

www.nrfirescience.org/resource/11009
Forest Service managers and researchers designed and evaluated alternative disturbance-based fire hazard reduction/ecosystem restoration treatments in a greatly altered low-elevation ponderosa pine/Douglas-fir/western larch wildland urban interface. Collaboratively planned improvement cutting and prescribed fire treatment...

Author(s): Steve Slaughter, Laura Ward, Michael Hillis, Jimmie D. Chew, Becky McFarlan
Year Published: 2003
Type: Document
Conference Proceedings

Linaria dalmatica, Linaria vulgaris (Dalmatian toadflax, yellow toadflax)

www.nrfirescience.org/resource/10489
This FEIS species review synthesizes information on the relationship of Linaria dalmatica, Linaria vulgaris (Dalmatian toadflax, yellow toadflax) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is...

Author(s): Kristin L. Zouhar
Year Published: 2003
Type: Document
Synthesis

Pinus ponderosa var. scopulorum (interior ponderosa pine)

www.nrfirescience.org/resource/10718
This FEIS species review synthesizes information on the relationship of Pinus ponderosa var. scopulorum (interior ponderosa pine) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,....

Author(s): Janet L. Howard
Year Published: 2003
Type: Document
Synthesis

Larix occidentalis (western larch)

www.nrfirescience.org/resource/10826
This FEIS species review synthesizes information on the relationship of Larix occidentalis (western larch) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,....

Author(s): Janette S. Scher
Year Published: 2002
Type: Document
Synthesis
Estimating canopy fuels in conifer forests
www.nrfirescience.org/resource/8403
Crown fires occur in a variety of coniferous forest types (Agee 1993), including some that are not historically prone to crown fire, such as ponderosa pine (Mutch and others 1993). The head fire spread rate of a crown fire is usually several times faster than that of a surface fire burning under the same conditions, which leads to a...
Author(s): Joe H. Scott, Elizabeth D. Reinhardt
Year Published: 2002
Type: Document
Book or Chapter or Journal Article

Fire as a coarse filter for snags and logs
www.nrfirescience.org/resource/11075
Fire played an important role in maintaining and creating conditions suitable for native flora and fauna in the forests of western North America. Recent coarse filter conservation strategies have advocated creating future landscapes that incorporate historic or natural ranges of variability, including fire regimes. Historic fire...
Author(s): James K. Agee
Year Published: 2002
Type: Document
Conference Proceedings, Technical Report or White Paper

Carex geyeri (elk sedge)
www.nrfirescience.org/resource/10615
This FEIS species review synthesizes information on the relationship of Carex geyeri (elk sedge) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Amy C. Chadwick
Year Published: 2002
Type: Document
Synthesis

Lythrum salicaria (purple loosestrife)
www.nrfirescience.org/resource/10467
This FEIS species review synthesizes information on the relationship of Lythrum salicaria (purple loosestrife) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...
Author(s): Gregory T. Munger
Year Published: 2002
Type: Document
Synthesis

Carduus nutans (musk thistle)
www.nrfirescience.org/resource/10494
This FEIS species review synthesizes information on the relationship of Carduus nutans (musk thistle) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the
Using FVS and its fire and fuels extension in the context of uncertain climate
www.nrfirescience.org/resource/11011
While the prospect of a static climate is no longer tenable, the direction of change for particular localities is not yet clear. Modelling vulnerability of silvicultural options to various scenarios of climate change requires a modelling system that can represent major processes affected by climatic variability.

Cirsium vulgare (bull thistle)
www.nrfirescience.org/resource/10492
This FEIS species review synthesizes information on the relationship of Cirsium vulgare (bull thistle) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy....

Schizachyrium scoparium (little bluestem)
www.nrfirescience.org/resource/10852
This FEIS species review synthesizes information on the relationship of Schizachyrium scoparium (little bluestem) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Juniperus scopulorum (Rocky Mountain juniper)
www.nrfirescience.org/resource/10827
This FEIS species review synthesizes information on the relationship of Juniperus scopulorum (Rocky Mountain juniper) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
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
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

Elymus lanceolatus (thickspike wheatgrass)

www.nrfirescience.org/resource/10825
This FEIS species review synthesizes information on the relationship of Elymus lanceolatus (thickspike wheatgrass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Janette S. Scher
Year Published: 2002
Type: Document
Synthesis

Landscape-scale controls over 20th century fire occurrence in two large Rocky Mountain (USA) wilderness areas

www.nrfirescience.org/resource/8140
Topography, vegetation, and climate act together to determine the spatial patterns of fires at landscape scales. Knowledge of landscape-fire-climate relations at these broad scales (1,000s ha to 100,000s ha) is limited and is largely based on inferences and extrapolations from fire histories reconstructed from finer scales. In this...
Author(s): Matthew G. Rollins, Penelope Morgan
Year Published: 2002
Type: Document
Book or Chapter or Journal Article

Leymus cinereus (basin wildrye)

www.nrfirescience.org/resource/10601
This FEIS species review synthesizes information on the relationship of Leymus cinereus (basin wildrye) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Michelle B. Anderson
Year Published: 2002
Type: Document
Synthesis

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

www.nrfirescience.org/resource/11198
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,
Cynoglossum officinale (houndstongue)
www.nrfirescience.org/resource/10500
This FEIS species review synthesizes information on the relationship of Cynoglossum officinale (houndstongue) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...
Author(s): Kristin L. Zouhar
Year Published: 2002
Type: Document
Synthesis

Microbial activity and nitrogen mineralization in forest mineral soils following heating: evaluation of post-fire effects
www.nrfirescience.org/resource/8292
Heat generated during fire induces chemical oxidation of soil organic matter thereby altering carbon (C) and nitrogen (N) transformations. Prior soil fire history and soil moisture content at the time of heating can be confounding factors in the interpretation of the influence of heat on soil processes. In this study we evaluated...
Author(s): Urszula Choromanska, Thomas H. DeLuca
Year Published: 2002
Type: Document
Book or Chapter or Journal Article

Artemisia cana, Artemisia cana subsp. Bolanderi, Artemisia cana subsp. cana, Artemisia cana subsp. viscidula (silver sagebrush, Bolander silver sagebrush, plains silver sagebrush, mountain silver sagebrush)
www.nrfirescience.org/resource/10729
This FEIS species review synthesizes information on the relationship of Artemisia cana, Artemisia cana subsp. Bolanderi, Artemisia cana subsp. cana, Artemisia cana subsp. viscidula (silver sagebrush, Bolander silver sagebrush, plains silver sagebrush, mountain silver sagebrush) to fire--how fire affects the species and its habitat,...
Author(s): Janet L. Howard
Year Published: 2002
Type: Document
Synthesis

Cascading effects of fire exclusion in Rocky Mountain ecosystems: a literature review
www.nrfirescience.org/resource/11187
The health of many Rocky Mountain ecosystems is in decline because of the policy of excluding fire in the management of these ecosystems. Fire exclusion has actually made it more difficult to fight fires, and this poses greater risks to the people who fight fires and for those who live in and around Rocky Mountain forests and...
Author(s): Robert E. Keane, Kevin C. Ryan, Thomas T. Veblen, Craig D. Allen, Jesse A. Logan, Brad C. Hawkes
Year Published: 2002
Type: Document
Pseudotsuga menziesii var. glauca (Rocky Mountain Douglas-fir)
www.nrfirescience.org/resource/10853
This FEIS species review synthesizes information on the relationship of Pseudotsuga menziesii var. glauca (Rocky Mountain Douglas-fir) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,....
Author(s): Peter D. Steinberg
Year Published: 2002
Type: Document
Synthesis

Balsamorhiza sagittata (arrowleaf balsamroot)
www.nrfirescience.org/resource/10789
This FEIS species review synthesizes information on the relationship of Balsamorhiza sagittata (arrowleaf balsamroot) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Jack McWilliams
Year Published: 2002
Type: Document
Synthesis

Populus balsamifera subsp. trichocarpa (black cottonwood)
www.nrfirescience.org/resource/10851
This FEIS species review synthesizes information on the relationship of Populus balsamifera subsp. trichocarpa (black cottonwood) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,....
Author(s): Peter D. Steinberg
Year Published: 2001
Type: Document
Synthesis

Abies concolor (white fir)
www.nrfirescience.org/resource/10936
This FEIS species review synthesizes information on the relationship of Abies concolor (white fir) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and...
Author(s): Kristin L. Zouhar
Year Published: 2001
Type: Document
Synthesis

Pinus flexilis (limber pine)
www.nrfirescience.org/resource/10741
This FEIS species review synthesizes information on the relationship of Pinus flexilis (limber pine) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire
management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and... 
Author(s): Kathleen A. Johnson 
Year Published: 2001 
Type: Document 
Synthesis 

**Centaurea diffusa (diffuse knapweed)**
www.nrfirescience.org/resource/10481
This FEIS species review synthesizes information on the relationship of Centaurea diffusa (diffuse knapweed) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,...
Author(s): Kristin L. Zouhar 
Year Published: 2001 
Type: Document 
Synthesis 

**Water quality, substratum and biotic responses of five central Idaho (USA) streams during the first year following the Mortar Creek fire**
www.nrfirescience.org/resource/11442
The Mortar Creek Fire burned 26 000 ha of mixed-conifer Rocky Mountain forest in July-August 1979. Changes in burn stream conditions were examined relative to reference streams for various ecological factors on two to six occasions, from October 1979 to August 1980. Factors included major ions and nutrients, suspended and benthic...
Author(s): G. Wayne Minshall, James T. Brock, Douglas A. Andrews, Christopher T. Robinson 
Year Published: 2001 
Type: Document 
Book or Chapter or Journal Article 

**Tetradymia canescens (gray horsebrush)**
www.nrfirescience.org/resource/10824
This FEIS species review synthesizes information on the relationship of Tetradymia canescens (gray horsebrush) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Janette S. Scher 
Year Published: 2001 
Type: Document 
Synthesis 

**Evaluating a century of fire patterns in two Rocky Mountain wilderness areas using digital fire atlases**
www.nrfirescience.org/resource/8139
Changes in fire size, shape, and frequency under different fire-management strategies were evaluated using time series of fire perimeter data (fire atlases) and mapped potential vegetation types (PVTs) in the Gila-Aldo Leopold Wilderness Complex (GALWC) in New Mexico and the Selway-Bitterroot Wilderness Complex (SBWC) in Idaho and...
Author(s): Matthew G. Rollins, Thomas W. Swetnam, Penelope Morgan 
Year Published: 2001 
Type: Document
Vaccinium scoparium (grouse whortleberry)
www.nrfirescience.org/resource/10501
This FEIS species review synthesizes information on the relationship of Vaccinium scoparium (grouse whortleberry) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Kathleen A. Johnson
Year Published: 2001
Type: Document
Synthesis

Nassella viridula (green needlegrass)
www.nrfirescience.org/resource/10869
This FEIS species review synthesizes information on the relationship of Nassella viridula (green needlegrass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology...
Author(s): Jennifer L. Taylor
Year Published: 2001
Type: Document
Synthesis

Reproductive success of Lewis's woodpecker in burned pine and cottonwood riparian forests
www.nrfirescience.org/resource/11418
Lewis's Woodpecker (Melanerpes lewis) has been characterized as a "burn specialist" because of its preference for nesting within burned pine forests. No prior study, however, has demonstrated the relative importance of crown-burned forests to this woodpecker species by examining its reproductive success in different forest types. We...
Author(s): Victoria A. Saab, Kerri T. Vierling
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Populus angustifolia (narrowleaf cottonwood)
www.nrfirescience.org/resource/10829
This FEIS species review synthesizes information on the relationship of Populus angustifolia (narrowleaf cottonwood) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...
Author(s): Kevin A. Simonin
Year Published: 2001
Type: Document
Synthesis

Dasiphora floribunda (shrubby cinquefoil)
www.nrfirescience.org/resource/10608
This FEIS species review synthesizes information on the relationship of Dasiphora floribunda (shrubby cinquefoil) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire
regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

**Author(s):** Michelle B. Anderson  
**Year Published:** 2001  
**Type:** Document  
**Synthesis**

**Cirsium arvense (Canada thistle)**  
[www.nrfirescience.org/resource/10482](http://www.nrfirescience.org/resource/10482)  
This FEIS species review synthesizes information on the relationship of Cirsium arvense (Canada thistle) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy,...  
**Author(s):** Kristin L. Zouhar  
**Year Published:** 2001  
**Type:** Document  
**Synthesis**

**Benthic macroinvertebrate assemblages in five central Idaho (USA) streams over a 10-year period following disturbance by wildfire**  
[www.nrfirescience.org/resource/11443](http://www.nrfirescience.org/resource/11443)  
The effects of wildfire on benthic macroinvertebrate assemblages of streams in mixed-conifer forest were examined for 10 successive years following the Mortar Creek Fire of 1979. Changes in burned-catchment streams were evaluated relative to a paired set of reference-catchment streams. Taxa richness and total abundance tended to be...  
**Author(s):** G. Wayne Minshall, Christopher T. Robinson, Deron E. Lawrence, Douglas A. Andrews, James T. Brock  
**Year Published:** 2001  
**Type:** Document  
**Book or Chapter or Journal Article**

**Salix scouleriana (Scouler willow)**  
[www.nrfirescience.org/resource/10606](http://www.nrfirescience.org/resource/10606)  
This FEIS species review synthesizes information on the relationship of Salix scouleriana (Scouler willow) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...  
**Author(s):** Michelle B. Anderson  
**Year Published:** 2001  
**Type:** Document  
**Synthesis**

**Alternative ponderosa pine restoration treatments in the western United States**  
[www.nrfirescience.org/resource/8409](http://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
The dynamic path of recreational values following a forest fire: a comparative analysis of states in the Intermountain West

This analysis examines the dynamic path of recreational values following a forest fire in three different states in the intermountain western United States. The travel cost demand analysis found that annual recreation values after a fire follow a highly nonlinear intertemporal path. The path is S-shaped, providing a range of...

Author(s): Jeffrey Englin, John B. Loomis, Armando Gonzalez-Caban
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Taeniatherum caput-medusae (medusahead)

This FEIS species review synthesizes information on the relationship of Taeniatherum caput-medusae (medusahead) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species'...

Author(s): Amy Archer
Year Published: 2001
Type: Document
Synthesis

Educational program about wildland fire integrates plant science into curriculum

A science fiction story by Edmond Hamilton entitled 'Alien Earth' (Hamilton 1949) describes the experience of a young scientist in a tropical country. The scientist obtains a potion that slows his physiology to a rate at which he can perceive plant growth and interactions between plants in rapid, aggressive, even violent motion. He...

Author(s): Jane Kapler Smith, Nancy E. McMurray, Garon C. Smith
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Ceanothus velutinus (snowbrush ceanothus)

This FEIS species review synthesizes information on the relationship of Ceanothus velutinus (snowbrush ceanothus) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic...

Author(s): Michelle B. Anderson
Year Published: 2001
Type: Document
Synthesis

Elymus elymoides (bottlebrush squirreltail)

This FEIS species review synthesizes information on the relationship of Elymus elymoides (bottlebrush...
Centaurea maculosa (spotted knapweed)

This FEIS species review synthesizes information on the relationship of Centaurea maculosa (spotted knapweed) to fire—how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy...

Author(s): Kristin L. Zouhar
Year Published: 2001
Type: Document
Synthesis

Ponderosa pine ecosystems restoration and conservation: steps toward stewardship; April 25-27, 2000; Flagstaff, AZ

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

Acer glabrum (Rocky Mountain maple)

This FEIS species review synthesizes information on the relationship of Acer glabrum (Rocky Mountain maple) to fire—how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology,...

Author(s): Michelle B. Anderson
Year Published: 2001
Type: Document
Synthesis

Database for early postfire succession in Northern Rocky Mountain forests

Provided data on quantitative postfire changes of plant species and forest vegetation components for up to the first 25 years of secondary plant succession for 55 forest sites in northern Idaho and northwestern Montana. Cover (aerial crown) and volume (aerial crown space occupied) data are presented as percent cover (m²/0.01 ha) and...

Author(s): Peter F. Stickney, Robert B. Campbell
Year Published: 2000
Type: Document
Fire, competition, and forest pests: landscape treatment to sustain ecosystem function
www.nrfirescience.org/resource/10988
Fire, competition for light and water, and native forest pests have interacted for millennia in western forests to produce a countryside dominated by seral species of conifers. These conifer-dominated ecosystems exist in six kinds of biotic communities. We divided one of these communities, the Rocky Mountain Montane Conifer Forest,...
Author(s): Geral I. McDonald, Alan E. Harvey, Jonalea R. Tonn
Year Published: 2000
Type: Document
Conference Proceedings

Influence of fire on native nitrogen-fixing plants and soil nitrogen status in ponderosa pine-Douglas-fir forests in western Montana
www.nrfirescience.org/resource/8258
Nitrogen fixing plants have been reported to play an important role in replacing N lost from soil in fire dominated ecosystems. Exclusion of fire from ponderosa pine (Pinus ponderosa Dougl. ex Laws.)-Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) forests of western Montana has lead to widespread changes in forest structure,...
Author(s): J. A. Newland, Thomas H. DeLuca
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Abies grandis (grand fir)
www.nrfirescience.org/resource/10739
This FEIS species review synthesizes information on the relationship of Abies grandis (grand fir) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): Janet L. Howard, Keith Aleksoff
Year Published: 2000
Type: Document
Synthesis

The Mann Gulch Fire and the Canadian Forest Fire Danger Rating System
www.nrfirescience.org/resource/8408
The year 1999 marks the 50th anniversary of the Mann Gulch Fire that occurred in western Montana on August 5, 1949 (Matthews 1999). There has been considerable interest amongst the Canadian wildland fire community in the 1949 Mann Gulch Fire ever since the publishing of MacLean's (1992) book 'Young Men and Fire' and Rothermel's (... 
Author(s): Martin E. Alexander
Year Published: 2000
Type: Document
Conference Proceedings

Measuring and modelling soil erosion processes in forests
www.nrfirescience.org/resource/7923
A prime forest resource is clean water for downstream beneficial uses. Sediment from forests may
impair those beneficial uses. Sedimentation by water erosion is rare unless road activities, timber harvesting, or fire disturb the forest. We have been researching forest soil erosion processes and developing erosion prediction models...

Author(s): William J. Elliot, Randy B. Foltz, Peter R. Robichaud
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Fire effects on infiltration rates after prescribed fire in Northern Rocky Mountain forests, USA
www.nrfirescience.org/resource/8134
Infiltration rates in undisturbed forest environments are generally high. These high infiltration rates may be reduced when forest management activities such as timber harvesting and/or prescribed fires are used. Post-harvest residue burning is a common site preparation treatment used in the Northern Rocky Mountains, USA, to reduce...
Author(s): Peter R. Robichaud
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Calamagrostis rubescens (pinegrass)
www.nrfirescience.org/resource/10755
This FEIS species review synthesizes information on the relationship of Calamagrostis rubescens (pinegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Robin F. Matthews
Year Published: 2000
Type: Document
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

Sporobolus cryptandrus (sand dropseed)
www.nrfirescience.org/resource/10836
This FEIS species review synthesizes information on the relationship of Sporobolus cryptandrus (sand dropseed) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Kevin A. Simonin
Year Published: 2000
Type: Document
**Synthesis**

**Silvicultural treatments**
[www.nrifirescience.org/resource/11891](www.nrifirescience.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...

Author(s): Carl E. Fiedler
Year Published: 2000
Type: Document
Conference Proceedings

**Elymus canadensis (Canada wildrye)**
[www.nrifirescience.org/resource/10831](www.nrifirescience.org/resource/10831)
This FEIS species review synthesizes information on the relationship of Elymus canadensis (Canada wildrye) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Kevin A. Simonin
Year Published: 2000
Type: Document

**Fire in western forest ecosystems**
[www.nrifirescience.org/resource/11115](www.nrifirescience.org/resource/11115)
Description not entered
Author(s): Stephen F. Arno
Year Published: 2000
Type: Document
Technical Report or White Paper

**Achnatherum thurberiana (Thurber needlegrass)**
[www.nrifirescience.org/resource/10610](www.nrifirescience.org/resource/10610)
This FEIS species review synthesizes information on the relationship of Achnatherum thurberiana (Thurber needlegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Amy Archer
Year Published: 2000
Type: Document

**Fire-climate interactions in the Selway-Bitterroot Wilderness area**
[www.nrifirescience.org/resource/11887](www.nrifirescience.org/resource/11887)
Tree-ring reconstructed summer drought was examined in relation to the occurrence of 15 fires in the Selway-Bitterroot Wilderness Area (SBW). The ten largest fire years between 1880 and 1995 were selected from historical fire atlas data; five additional fire years were selected from a fire history completed in a subalpine forest...

Author(s): Kurt F. Kipfmueller, Thomas W. Swetnam
Twentieth-century fire patterns in the Selway-Bitterroot Wilderness Area, Idaho/ Montana, and the Gila/Aldo Leopold Wilderness Complex, New Mexico
www.nrfirescience.org/resource/11001
Twentieth century fire patterns were analyzed for two large, disparate wilderness areas in the Rocky Mountains. Spatial and temporal patterns of fires were represented as GIS-based digital fire atlases compiled from archival Forest Service data. We find that spatial and temporal fire patterns are related to landscape features and...
Author(s): Matthew G. Rollins, Thomas W. Swetnam, Penelope Morgan
Year Published: 2000
Type: Document
Conference Proceedings

Ecosystem-based management at lower elevations
www.nrfirescience.org/resource/8423
Our experience testing ecosystem-based management (EM) treatments in ponderosa pine (Pinus ponderosa)/fir (Abies spp.) is summarized here. Topics covered include silvicultural treatments, fire application, soils and nutrient considerations, wildlife habitat considerations, associated riparian communities, and treatment of invasive...
Author(s): Stephen F. Arno
Year Published: 2000
Type: Document
Conference Proceedings

Festuca idahoensis (Idaho fescue)
www.nrfirescience.org/resource/10937
This FEIS species review synthesizes information on the relationship of Festuca idahoensis (Idaho fescue) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Kristin L. Zouhar
Year Published: 2000
Type: Document
Synthesis

Festuca altaica, Festuca campestris, Festuca hallii (northern rough fescue, alpine rough fescue, plains rough fescue)
www.nrfirescience.org/resource/10881
This FEIS species review synthesizes information on the relationship of Festuca altaica, Festuca campestris, Festuca hallii (northern rough fescue, alpine rough fescue, plains rough fescue) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy...
Author(s): D. A. Tirmenstein
Year Published: 2000
Type: Document
Synthesis
**Ceanothus sanguineus (redstem ceanothus)**

www.nrfirescience.org/resource/10742

This FEIS species review synthesizes information on the relationship of Ceanothus sanguineus (redstem ceanothus) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Kathleen A. Johnson  
Year Published: 2000  
Type: Document  
Synthesis

**Symphoricarpos albus (common snowberry)**

www.nrfirescience.org/resource/10783

This FEIS species review synthesizes information on the relationship of Symphoricarpos albus (common snowberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Jack McWilliams  
Year Published: 2000  
Type: Document  
Synthesis

**Prunus virginiana (chokecherry)**

www.nrfirescience.org/resource/10503

This FEIS species review synthesizes information on the relationship of Prunus virginiana (chokecherry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Author(s): Kathleen A. Johnson  
Year Published: 2000  
Type: Document  
Synthesis

**Sequential use of simulation and optimization in analysis and planning**

www.nrfirescience.org/resource/11045

Management activities are analyzed at landscape scales employing both simulation and optimization. SIMPPLLLE, a stochastic simulation modeling system, is initially applied to assess the risks associated with a specific natural process occurring on the current landscape without management treatments, but with fire suppression. These...

Author(s): Hans R. Zuuring, Jimmie D. Chew, J. Greg Jones  
Year Published: 2000  
Type: Document  
Conference Proceedings

**An overview of the fire and fuels extension to the forest vegetation simulator**

www.nrfirescience.org/resource/11037

The Fire and Fuels Extension (FFE) to the Forest Vegetation Simulator (FVS) has been developed to assess the risk, behavior, and impact of fire in forest ecosystems. This extension to the widely-used stand-dynamics model FVS simulates the dynamics of snags and surface fuels as they are affected by stand management (of trees or fuels... 

Author(s): Sarah J. Beukema, Elizabeth D. Reinhardt, Werner A. Kurz, Nicholas L. Crookston
**Water repellency by laboratory burning of four Northern Rocky Mountain forest soils**

www.nrfirescience.org/resource/8133

Highly variable water repellent soil conditions have been reported after forest fires. We examined interactions among heating, soil water content and soil texture on water repellency. Undisturbed, 305-mm diameter cores were collected in the field from four soils commonly referred to as ash-cap, mixed ash-cap, no ash-cap and granitic...

Author(s): Peter R. Robichaud, Roger D. Hungerford
Year Published: 2000
Type: Document

**Wildlife habitat considerations**

www.nrfirescience.org/resource/11034

Fire, insects, disease, harvesting, and precommercial thinning all create mosaics on Northern Rocky Mountain landscapes. These mosaics are important for faunal habitat. Consequently, changes such as created openings or an increase in heavily stocked areas affect the water, cover, and food of forest habitats. The 'no action'...

Author(s): Helen Y. Smith
Year Published: 2000
Type: Document

**Achnatherum lettermanii (Letterman's needlegrass)**

www.nrfirescience.org/resource/10866

This FEIS species review synthesizes information on the relationship of Achnatherum lettermanii (Letterman's needlegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Jane E. Taylor
Year Published: 2000
Type: Document

**Comparing historic and modern forests on the Bitterroot Front**

www.nrfirescience.org/resource/10967

A study was initiated in 1995 to measure landscape changes in forest structures between 1900 and 1995. A systematic sampling system was used to collect data on three forested faces on the Bitterroot Front. Over 1,200 tree cores were taken on 216 plots between the elevation range of 4,500 to 7,500 feet. Historic forests were...

Author(s): Michael G. Hartwell, Paul B. Alaback, Stephen F. Arno
Year Published: 2000
Type: Document

**Danthonia unispicata (onespike oatgrass)**

www.nrfirescience.org/resource/10754
This FEIS species review synthesizes information on the relationship of Danthonia unispicata (onespike oatgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Robin F. Matthews
Year Published: 2000
Type: Document
Synthesis

Fire applications in ecosystem management
www.nrfirescience.org/resource/10965
Decades of fire absence from ponderosa pine/Douglas fir forests has resulted in overstocked, unhealthy, and severe fire prone stands requiring management attention. Prescribed fire can be used in three general situations during restoration management. First is when fuel loadings are excessive from either natural accumulation or...

Author(s): Michael G. Harrington
Year Published: 2000
Type: Document
Conference Proceedings

The Bitterroot Ecosystem Management Research Project: what we have learned, symposium proceedings; May 18-20, 1999; Missoula, MT
www.nrfirescience.org/resource/11890
The varied topics presented in these symposium proceedings represent the diverse nature of the Bitterroot Ecosystem Management Research Project (BEMRP). Separated into six sections, the papers cover the different themes researched by BEMRP collaborators as well as brief overviews of five other ecosystem management projects. The...

Author(s): Helen Y. Smith
Year Published: 2000
Type: Document
Conference Proceedings

Effects of selection harvest and prescribed fire on the soil nitrogen status of ponderosa pine forests
www.nrfirescience.org/resource/8272
One hundred years of timber harvest and reduced fire frequency have resulted in the conversion of once open stands of ponderosa pine (Pinus ponderosa) forests to dense forests dominated by Douglas-fir (Pseudotsuga menziesii). Selection harvest and harvest with prescribed fire have been identified as possible tools to restore...

Author(s): Thomas H. DeLuca, Kristin L. Zouhar
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

Fuel: logs, sticks, needles, duff, and much more
www.nrfirescience.org/resource/10957
Fuels burned by either prescribed or wildfires are complex and important components of forested ecosystems. Fine fuels consisting of fallen limbs, twigs, and leaves of shrubs and trees are rich in nutrients. If these fuels are not immediately burned, nutrients can leach from these materials into the forest floor, especially if they...

Author(s): Russell T. Graham, Theresa B. Jain, Alan E. Harvey
**Koeleria macrantha (prairie Junegrass)**

www.nrfirescience.org/resource/10830

This FEIS species review synthesizes information on the relationship of Koeleria macrantha (prairie Junegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Kevin A. Simonin
Year Published: 2000
Type: Document
Synthesis

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**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

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**Achnatherum nelsonii (Columbia needlegrass)**

www.nrfirescience.org/resource/10938

This FEIS species review synthesizes information on the relationship of Achnatherum nelsonii (Columbia needlegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Kristin L. Zouhar
Year Published: 2000
Type: Document
Synthesis

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**Vaccinium membranaceum (big huckleberry)**

www.nrfirescience.org/resource/10828

This FEIS species review synthesizes information on the relationship of Vaccinium membranaceum (big huckleberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Kevin A. Simonin
Year Published: 2000
Type: Document
Synthesis

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**Fire hazard and potential treatment effectiveness: a statewide assessment in Montana**
This assessment of Montana used data collected from Forest Inventory and Analysis (FIA) plots across Montana and summarized by forest type, density, and structure. The focus of the analysis was on ponderosa pine/Douglas fir/ dry mixed conifer forests that had historically seen low-intensity fires.

Pascopyrum smithii (western wheatgrass)

This FEIS species review synthesizes information on the relationship of Pascopyrum smithii (western wheatgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

80 years of change in a ponderosa pine forest

Living things change constantly, as do communities of living things. In a forest, where individual trees can live for centuries and new plants replace old plants, it is not easy to visualize the changes that occur over time. Luckily, we have some records and photos that illustrate how forests change. This poster shows how one stand...

Spatial interpolation and simulation of post-burn duff thickness after prescribed fire

Prescribed fire is used as a site treatment after timber harvesting. These fires result in spatial patterns with some portions consuming all of the forest floor material (duff) and others consuming little. Prior to the burn, spatial sampling of duff thickness and duff water content can be used to generate geostatistical spatial...

Achillea millefolium (western yarrow)

This FEIS species review synthesizes information on the relationship of Achillea millefolium (western yarrow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
The effects of thinning and similar stand treatments on fire behavior in western forests

www.nrfirescience.org/resource/11183

In the West, thinning and partial cuttings are being considered for treating millions of forested acres that are overstocked and prone to wildfire. The objectives of these treatments include tree growth redistribution, tree species regulation, timber harvest, wildlife habitat improvement, and wildfire-hazard reduction. Depending on...

Author(s): Russell T. Graham, Alan E. Harvey, Theresa B. Jain, Jonalea R. Tonn
Year Published: 1999
Type: Document
Technical Report or White Paper

Pseudoroegneria spicata (bluebunch wheatgrass)

www.nrfirescience.org/resource/10585

This FEIS species review synthesizes information on the relationship of Pseudoroegneria spicata (bluebunch wheatgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Elena Zlatnik
Year Published: 1999
Type: Document
Synthesis

Chrysothamnus nauseosus (rubber rabbitbrush)

www.nrfirescience.org/resource/10883

This FEIS species review synthesizes information on the relationship of Chrysothamnus nauseosus (rubber rabbitbrush) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

Antelope bitterbrush and Scouler's willow response to a shelterwood harvest and prescribed burn in western Montana

www.nrfirescience.org/resource/13367

In many western Montana ponderosa pine (Pinus ponderosa) stands, fire suppression and past selective logging of large trees have resulted in conditions favoring succession to dense stands of shade-tolerant, but insect- and disease-prone Douglas-fir (Pseudotsuga menziesii). Stand thinning and understory prescribed burning have been...

Author(s): Donald J. Bedunah, Michael G. Harrington, Dayna M. Ayers
Year Published: 1999
Type: Document
Book or Chapter or Journal Article

Achnatheruum hymenoides (Indian ricegrass)

www.nrfirescience.org/resource/10870
Danthonia intermedia (timber oatgrass)
www.nrfirescience.org/resource/10882
This FEIS species review synthesizes information on the relationship of Danthonia intermedia (timber oatgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

Germination and initial growth of four coniferous species on varied duff depths in northern Idaho
www.nrfirescience.org/resource/13129
Four conifer species [Douglas-fir (Pseudotsuga menziesii var. glauca (Beissn.) Franco), ponderosa pine (Pinus ponderosa Dougl. ex. Laws.), western larch (Larix occidentalis Nutt.), and western white pine (Pinus monticola Dougl. ex. D. Don)], growing on three different duff depths on burned and unburned seedbeds, were examined for...
Author(s): Brian P. Oswald, Kent Wellner, Robin Boyce, Leon F. Neuenschwander
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

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

Development of input data layers for the FARSITE fire growth model for the Selway-Bitterroot Wilderness Complex, USA
www.nrfirescience.org/resource/11240
Fuel and vegetation spatial data layers required by the spatially explicit fire growth model FARSITE were developed for all lands in and around the Selway-Bitterroot Wilderness Area in Idaho and Montana. Satellite imagery and terrain modeling were used to create the three base vegetation spatial data layers of potential vegetation,...
Author(s): Robert E. Keane, Janice L. Garner, Kirsten M. Schmidt, Donald G. Long, James P. Menakis, Mark A. Finney
Year Published: 1998
Type: Document
Technical Report or White Paper
Effects of slash pile burning on the physical and chemical soil properties of Vassar soils
www.nrfirescience.org/resource/13125
To determine the initial effects of slash pile burning on chemical and physical properties in the Vassar soil series, mineral soil samples from two depths (2.5 cm and 12.5 cm) were collected before and after burning slash piles of four fuel loadings (0.5 m, 1 m, 2 m and 3 m) over wet and dry soils, as well as from burned and...
Author(s): Brian P. Oswald, Douglas Davenport, Leon F. Neuenschwander
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

Fire and insects in northern and boreal forest ecosystems of North America
www.nrfirescience.org/resource/7945
Fire and insects are natural disturbance agents in many forest ecosystems, often interacting to affect succession, nutrient cycling, and forest species composition. We review literature pertaining to effects of fire-insect interactions on ecological succession, use of prescribed fire for insect pest control, and effects of fire on...
Author(s): Deborah G. McCullough, Richard A. Werner, David Neumann
Year Published: 1998
Type: Document
Book or Chapter or Journal Article, Synthesis

Patterns of lodgepole pine regeneration following the 1988 Yellowstone fires
www.nrfirescience.org/resource/8276
In 1988, fires killed extensive lodgepole pine (Pinus contorta Dougl. ex. Loud) in Yellowstone National Park. This species bears both serotinous and non-serotinous cones, with the former most common in fire-origin stands of an even-aged character. Reconnaissance of burned stands indicated that former even-aged communities...
Author(s): Ralph D. Nyland
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

Assessing simulated ecosystem processes for climate variability research at Glacier National Park, USA
www.nrfirescience.org/resource/8378
Glacier National Park served as a test site for ecosystem analyses that involved a suite of integrated models embedded within a geographic information system. The goal of the exercise was to provide managers with maps that could illustrate probable shifts in vegetation, net primary production (NPP), and hydrologic responses...
Author(s): Joseph D. White, Steven W. Running, Peter Thornton, Robert E. Keane, Kevin C. Ryan, Daniel B. Fagre, Carl H. Key
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

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

Seventeen years of forest succession following the Waterfalls Canyon Fire in Grand Teton National Park, Wyoming
www.nrfirescience.org/resource/8214
Plant species composition has been sampled periodically since the 1974 Waterfalls Canyon Fire in Grand Teton National Park, Wyoming. Prior to the fire, the forests were dominated by mature Abies lasiocarpa, Picea engelmannii and Pinus contorta. All three tree species have reestablished. After 17 years, P. engelmannii sapling density...
Author(s): Kathleen M. Doyle, Dennis H. Knight, Dale L. Taylor, William J. Barmore, James M. Benedict
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

Fuel reduction in residential and scenic forests: a comparison of three treatments in a western Montana ponderosa pine stand
www.nrfirescience.org/resource/11242
Three contrasting thinning treatments to reduce fire hazard were implemented in a 100-year-old ponderosa pine/Douglas-fir (Pinus ponderosa/Pseudotsuga menziesii) stand on the Lolo National Forest, MT. All treatments included a commercial thinning designed to reduce crown fuels and provide revenue to offset costs. The treatments are...
Author(s): Joe H. Scott
Year Published: 1998
Type: Document
Technical Report or White Paper

Fire history of an isolated subalpine mountain range of the intermountain region, United States
www.nrfirescience.org/resource/11438
Fire has historically been an important ecological component of forests in the Intermountain Region of the northwestern United States. This study is set in a small biogeographically disjunct mountain range. Our research objectives were to (1) investigate the historical frequency, severity, size, and spatial pattern of fire; (2)...
Author(s): Michael P. Murray, Stephen C. Bunting, Penelope Morgan
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
**Miller Creek Demonstration Forest - A forest born of fire: a field guide**

www.nrfirescience.org/resource/11239

Miller Creek, on the Flathead National Forest in northwest Montana, is a demonstration forest, showing up to 30 years of forest change after clearcutting and a wide range of fire treatments in 1967 and 1968. Differences in tree regeneration and vegetation development are explained for units that were clearcut and prescribed burned....

Author(s): Penelope A. Latham, Raymond C. Shearer, Kevin L. O'Hara
Year Published: 1998
Type: Document
Technical Report or White Paper

**Mapping historic fire regimes for the western United States: integrating remote sensing and biophysical data**

www.nrfirescience.org/resource/7937

We have developed a spatial database of historic natural fire regimes for the eleven western States to provide information in support of expected national increases in prescribed burning. Fire regimes are described in terms both of frequency and severity, and we have classified five distinct fire regimes:

Author(s): Colin C. Hardy, James P. Menakis, Donald G. Long, James K. Brown, David L. Bunnell
Year Published: 1998
Type: Document
Conference Proceedings

**Reduce fire hazards in ponderosa pine by thinning**

www.nrfirescience.org/resource/8148

Forest stands of fire-dependent ponderosa pine cover about 40 million acres (16 million ha) in the Western United States. Ponderosa pine is commonly found in pure stands on dry sites, but in more moist conditions, it is associated with Douglas-fir, lodgepole pine, western larch, and others. Historically, these were often widely...

Author(s): Joe H. Scott
Year Published: 1998
Type: Document
Book or Chapter or Journal Article

**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

**Poa cusickii (Cusick’s bluegrass)**
www.nrfirescience.org/resource/10706
This FEIS species review synthesizes information on the relationship of Poa cusickii (Cusick's bluegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet L. Howard
Year Published: 1997
Type: Document
Synthesis

Amelanchier alnifolia (Saskatoon serviceberry)
www.nrfirescience.org/resource/10730
This FEIS species review synthesizes information on the relationship of Amelanchier alnifolia (Saskatoon serviceberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Janet L. Howard
Year Published: 1997
Type: Document
Synthesis

Fire episodes in the Inland Northwest (1540-1940) based on fire history data
www.nrfirescience.org/resource/11233
Presents maps of major fire episodes in the inland northwestern United States between 1540 and 1940 based on a compilation of fire history studies. Estimates annual acreage historically burned in this region and compares that with recent fire years.
Author(s): Stephen W. Barrett, Stephen F. Arno, James P. Menakis
Year Published: 1997
Type: Document
Technical Report or White Paper

Wildfire and native fish: issues of forest health and conservation of sensitive species
www.nrfirescience.org/resource/8129
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...
Author(s): Bruce E. Rieman, Jim Clayton
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Aristida purpurea (purple threeawn)
www.nrfirescience.org/resource/10728
This FEIS species review synthesizes information on the relationship of Aristida purpurea (purple threeawn) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet L. Howard
Year Published: 1997
Type: Document
Restoring fire in lodgepole pine forests of the Intermountain West
www.nrfirescience.org/resource/8347
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...
Author(s): Colin C. Hardy, Ward W. McCaughey
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Plant species richness and composition following the 1988 Yellowstone fires
www.nrfirescience.org/resource/8341
How do plant species richness and community composition vary during initial postfire succession in relation to fire severity and local environmental conditions? We recorded vascular plant species present within 10-m2 plots at 589 permanent sampling points distributed throughout nine patches of crown fire from the 1988 Yellowstone...
Author(s): William H. Romme, Robert H. Gardner, Monica G. Turner, Daniel B. Tinker, Rebecca A. Reed
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Vegetation structure in old-growth stands in the Coram Research Natural Area in northwestern Montana
www.nrfirescience.org/resource/13138
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...
Author(s): Caryl L. Elzinga, Raymond C. Shearer
Year Published: 1997
Type: Document
Technical Report or White Paper

Ambystoma macrodactylum (long-toed salamander)
www.nrfirescience.org/resource/10732
This FEIS species review synthesizes information on the relationship of Ambystoma macrodactylum (long-toed salamander) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Janet L. Howard
Year Published: 1997
Type: Document
Synthesis

Fire ecology of the forest habitat types of northern Idaho
www.nrfirescience.org/resource/11234
Provides information on fire ecology in forest habitat and community types occurring in northern Idaho. Identifies fire groups based on presettlement fire regimes and patterns of succession and stand development after fire. Describes forest fuels and suggests considerations for fire management.

Author(s): Jane Kapler Smith, William C. Fischer
Year Published: 1997
Type: Document
Synthesis, Technical Report or White Paper

Old-growth ponderosa pine and western larch stand structures: influences of pre-1900 fires and fire exclusion
www.nrfirescience.org/resource/11967
Presents detailed age structure for two western larch stands that historically experienced frequent fires. Compares age structures of eleven ponderosa pine and western larch stands representing a broad range of sites that had frequent fires. Interprets causal factors possibly linked to variations in stand age structures.

Author(s): Stephen F. Arno, Helen Y. Smith, Michael A. Krebs
Year Published: 1997
Type: Document
Technical Report or White Paper

Geostatistics: a new tool for describing spatially-varied surface conditions from timber harvested and burned hillslopes
www.nrfirescience.org/resource/11012
Geostatistics provides a method to describe the spatial continuity of many natural phenomena. Spatial models are based upon the concept of scaling, kriging and conditional simulation. These techniques were used to describe the spatially-varied surface conditions on timber harvest and burned hillslopes.

Author(s): Peter R. Robichaud
Year Published: 1997
Type: Document
Conference Proceedings

Managerial and institutional factors affect prescribed burning costs
www.nrfirescience.org/resource/7931
Prescribed burning costs are extremely variable, even if conditions are similar. This variability complicates planning and evaluation of prescribed burning programs and budgets, resulting in imprecise projections of their economic benefits. Evaluating the worth of prescribed burning efforts in objective terms is difficult, but the...

Author(s): Armando Gonzalez-Caban
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Silvicultural applications: restoring ecological structure and process in ponderosa pine forests
www.nrfirescience.org/resource/11246
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...

Author(s): Carl E. Fiedler
Year Published: 1996
Simulation of crown fire effects on canopy seed bank in lodgepole pine

www.nrfirescience.org/resource/8215

Analysis of video footage taken of crown fires during the 1988 fire season in Yellowstone National Park indicated that the most frequent length of time required to completely burn tree crowns was 15-20 seconds. Lodge-pole pine (Pinus contorta Laws.) seeds were tested for ability to germinate after exposing both serotinous and...

Author(s): Don G. Despain, D. L. Clark, James J. Reardon
Year Published: 1996
Type: Document

The role of fire in Research Natural Areas in the Northern Rockies and Pacific Northwest

www.nrfirescience.org/resource/11244

Forest Service Research Natural Areas are established to preserve examples of all significant natural ecosystems for comparison with those influenced and/or managed by humans, to provide educational and research areas for ecological and environmental studies, and to preserve gene pools for typical and rare and endangered species....

Author(s): Sarah E. Greene, Angela Evenden
Year Published: 1996
Type: Document

The use of fire in forest restoration

www.nrfirescience.org/resource/11235

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

Stand hazard rating for central Idaho forests

www.nrfirescience.org/resource/11254

Growing concern over sustainability of central Idaho forests has created a need to assess the health of forest stands on a relative basis. A stand hazard rating was developed as a composite of 11 individual ratings to compare the health hazards of different stands. The composite rating includes Douglas-fir beetle, mountain pine...

Author(s): Robert W. Steele, Ralph E. Williams, Julie C. Weatherby, Elizabeth D. Reinhardt, James T. Hoffman, R. W. Thier
Year Published: 1996
Type: Document

Populus tremuloides (quaking aspen)

www.nrfirescience.org/resource/10717
This FEIS species review synthesizes information on the relationship of Populus tremuloides (quaking aspen) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Janet L. Howard
Year Published: 1996
Type: Document
Synthesis

Prescribed fire applications: restoring ecological structure and process in ponderosa pine forests
www.nrfirescience.org/resource/11247
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...

Author(s): Michael G. Harrington
Year Published: 1996
Type: Document
Technical Report or White Paper

Urocyon cinereoargenteus (common gray fox)
www.nrfirescience.org/resource/10506
This FEIS species review synthesizes information on the relationship of Urocyon cinereoargenteus (common gray fox) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Janet Sullivan
Year Published: 1996
Type: Document
Synthesis

The concept: restoring ecological structure and process in ponderosa pine forests
www.nrfirescience.org/resource/11245
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...

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

Remote sensing of forest fire severity and vegetation recovery
www.nrfirescience.org/resource/8152
Burned forested areas have patterns of varying burn severity as a consequence of various topographic, vegetation, and meteorological factors. These patterns are detected and mapped using satellite data. Other ecological information can be abstracted from satellite data regarding rates of recovery of vegetation foliage and variation...

Author(s): Joseph D. White, Kevin C. Ryan, Carl H. Key, Steven W. Running
Year Published: 1996
Mustela vison (American mink)
www.nrfirescience.org/resource/10513
This FEIS species review synthesizes information on the relationship of Mustela vison (American mink) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Janet Sullivan
Year Published: 1996
Type: Document
Synthesis

Consequences of fire on aquatic nitrate and phosphate dynamics in Yellowstone National Park
www.nrfirescience.org/resource/11990
Airborne remotely sensed data were collected and analyzed during and following the 1988 Greater Yellowstone Ecosystem (GYE) fires in order to characterize the fire front movements, burn intensities and various vegetative components of selected watersheds. Remotely sensed data were used to categorize the burn intensities as: severely...
Author(s): James A. Brass, Vincent G. Ambrosia, Philip J. Riggan, Paul D. Sebesta
Year Published: 1996
Type: Document
Conference Proceedings

Restoring recreational and residential forests
www.nrfirescience.org/resource/11249
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

Tamiasciurus hudsonicus (red squirrel)
www.nrfirescience.org/resource/10509
This FEIS species review synthesizes information on the relationship of Tamiasciurus hudsonicus (red squirrel) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Lynx rufus (bobcat)
www.nrfirescience.org/resource/10526
This FEIS species review synthesizes information on the relationship of Lynx rufus (bobcat) to fire--how
fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for fire...
Author(s): Julie L. Tesky
Year Published: 1995
Type: Document
Synthesis

**Sialia mexicana (western bluebird)**

[www.nrfirescience.org/resource/10505](http://www.nrfirescience.org/resource/10505)

This FEIS species review synthesizes information on the relationship of Sialia mexicana (western bluebird) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

**Restoring fire-dependent ponderosa pine forests in western Montana**

[www.nrfirescience.org/resource/13364](http://www.nrfirescience.org/resource/13364)

Many foresters and ecologists recognize that disruption of the historic pattern of frequent fires in ponderosa pine forests has resulted in major ecological changes, including increasingly severe wildfires and insect and disease epidemics (Weaver, 1943; Covington and Moore, 1992; Mutch and others, 1993; Everett, 1994). In response...
Author(s): Stephen F. Arno, Michael G. Harrington, Carl E. Fiedler, Clinton E. Carlson
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

**Schedonorus arundinaceus (tall fescue)**

[www.nrfirescience.org/resource/10479](http://www.nrfirescience.org/resource/10479)

This FEIS species review synthesizes information on the relationship of Schedonorus arundinaceus (tall fescue) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Roberta A. Walsh
Year Published: 1995
Type: Document
Synthesis

**Festuca rubra (red fescue)**

[www.nrfirescience.org/resource/10923](http://www.nrfirescience.org/resource/10923)

This FEIS species review synthesizes information on the relationship of Festuca rubra (red fescue) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): Roberta A. Walsh
Year Published: 1995
Type: Document
Synthesis
Age-class structure of old growth ponderosa pine/Douglas-fir stands and its relationship to fire history
www.nrfirescience.org/resource/11268
Describes age structure of nine old growth ponderosa pine/Douglas-fir stands in western Montana. Interprets the influence of past fires and 20th century fire exclusion on stand structure. Gives implications for management to restore and maintain these forests for multiple resource values.
Author(s): Stephen F. Arno, Joe H. Scott, Michael G. Hartwell
Year Published: 1995
Type: Document
Technical Report or White Paper

Bubo virginianus (great horned owl)
www.nrfirescience.org/resource/10518
This FEIS species review synthesizes information on the relationship of Bubo virginianus (great horned owl) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Prunus emarginata (bitter cherry)
www.nrfirescience.org/resource/10635
This FEIS species review synthesizes information on the relationship of Prunus emarginata (bitter cherry) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Lora L. Esser
Year Published: 1995
Type: Document
Synthesis

The composition of bird communities following stand-replacement fires in northern Rocky Mountain (U.S.A.) conifer forests
www.nrfirescience.org/resource/12934
During the two breeding seasons immediately following the numerous and widespread fires of 1988, I estimated bird community composition in each of 34 burned-forest sites in western Montana and northern Wyoming. I detected an average of 45 species per site and a total of 87 species in the sites combined. A compilation of these data...
Author(s): Richard L. Hutto
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

Puma concolor (mountain lion)
www.nrfirescience.org/resource/10534
This FEIS species review synthesizes information on the relationship of Puma concolor (mountain lion) to fire—how fire affects the species and its habitat, and fire management considerations. Information is
Ribes cereum (wax currant)
www.nrfirescience.org/resource/10753
This FEIS species review synthesizes information on the relationship of Ribes cereum (wax currant) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Anna Marshall
Year Published: 1995
Type: Document
Synthesis

Urtica dioica (stinging nettle)
www.nrfirescience.org/resource/10612
This FEIS species review synthesizes information on the relationship of Urtica dioica (stinging nettle) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Jennifer H. Carey
Year Published: 1995
Type: Document
Synthesis

Lepus americanus (snowshoe hare)
www.nrfirescience.org/resource/10515
This FEIS species review synthesizes information on the relationship of Lepus americanus (snowshoe hare) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Heracleum lanatum (cow parsnip)
www.nrfirescience.org/resource/10630
This FEIS species review synthesizes information on the relationship of Heracleum lanatum (cow parsnip) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Lora L. Esser
Year Published: 1995
Type: Document
Synthesis
Dichanthelium acuminatum (woolly panicum)
www.nrfirescience.org/resource/10914
This FEIS species review synthesizes information on the relationship of Dichanthelium acuminatum (woolly panicum) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Roberta A. Walsh
Year Published: 1995
Type: Document
Synthesis

Ribes aureum (golden currant)
www.nrfirescience.org/resource/10749
This FEIS species review synthesizes information on the relationship of Ribes aureum (golden currant) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Anna Marshall
Year Published: 1995
Type: Document
Synthesis

Peromyscus maniculatus (deer mouse)
www.nrfirescience.org/resource/10512
This FEIS species review synthesizes information on the relationship of Peromyscus maniculatus (deer mouse) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Lepus californicus (black-tailed jackrabbit)
www.nrfirescience.org/resource/10721
This FEIS species review synthesizes information on the relationship of Lepus californicus (black-tailed jackrabbit) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Janet L. Howard
Year Published: 1995
Type: Document
Synthesis

Sialia currucoides (mountain bluebird)
www.nrfirescience.org/resource/10510
This FEIS species review synthesizes information on the relationship of Sialia currucoides (mountain bluebird) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Canis latrans (coyote)
www.nrfirescience.org/resource/10548
This FEIS species review synthesizes information on the relationship of Canis latrans (coyote) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for fire...

Muhlenbergia montana (mountain muhly)
www.nrfirescience.org/resource/10919
This FEIS species review synthesizes information on the relationship of Muhlenbergia montana (mountain muhly) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Molothrus ater (brown-headed cowbird)
www.nrfirescience.org/resource/10444
This FEIS species review synthesizes information on the relationship of Molothrus ater (brown-headed cowbird) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...

Philadelphus lewisii (Lewis' mockorange)
www.nrfirescience.org/resource/10613
This FEIS species review synthesizes information on the relationship of Philadelphus lewisii (Lewis' mockorange) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Buteo lagopus (rough-legged hawk)
This FEIS species review synthesizes information on the relationship of Buteo lagopus (rough-legged hawk) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

**Spiraea douglasii (Douglas’ spirea)**
This FEIS species review synthesizes information on the relationship of Spiraea douglasii (Douglas’ spirea) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Lora L. Esser
Year Published: 1995
Type: Document
Synthesis

**Procyon lotor (northern raccoon)**
This FEIS species review synthesizes information on the relationship of Procyon lotor (northern raccoon) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Julie L. Tesky
Year Published: 1995
Type: Document
Synthesis

**Ribes lacustre (bristly black currant)**
This FEIS species review synthesizes information on the relationship of Ribes lacustre (bristly black currant) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Anna Marshall
Year Published: 1995
Type: Document
Synthesis

**Ribes oxyacanthoides (northern gooseberry)**
This FEIS species review synthesizes information on the relationship of Ribes oxyacanthoides (northern gooseberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Jennifer H. Carey
Year Published: 1995
Deschampsia cespitosa (tufted hairgrass)

This FEIS species review synthesizes information on the relationship of Deschampsia cespitosa (tufted hairgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Roberta A. Walsh
Year Published: 1995

Poecile atricapillus (black-capped chickadee)

This FEIS species review synthesizes information on the relationship of Poecile atricapillus (black-capped chickadee) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Janet Sullivan
Year Published: 1995

Comparing the prescribed natural fire program with presettlement fires in the Selway-Bitterroot Wilderness

The severity and extent of recent fires (1979-1990) were compared with that of presettlement fires (pre-1935) by eight major forest types in the Selway-Bitterroot Wilderness (SBW) in Idaho and Montana. Presettlement fire intervals were determined for estimating area burned. Presettlement annual area burned for the entire SBW was 4,...

Author(s): James K. Brown, Stephen F. Arno, Stephen W. Barrett, James P. Menakis
Year Published: 1994

Buteo jamaicensis (red-tailed hawk)

This FEIS species review synthesizes information on the relationship of Buteo jamaicensis (red-tailed hawk) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Julie L. Tesky
Year Published: 1994

Agrostis exarata (spike bentgrass)

This FEIS species review synthesizes information on the relationship of Agrostis exarata (spike bentgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
This FEIS species review synthesizes information on the relationship of Agrostis exarata (spike bentgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Lora L. Esser
Year Published: 1994
Type: Document
Synthesis

Chimaphila menziesii (little prince's-pine)
www.nrfirescience.org/resource/10780
This FEIS species review synthesizes information on the relationship of Chimaphila menziesii (little prince's-pine) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Robin F. Matthews
Year Published: 1994
Type: Document
Synthesis

Hierochloe odorata (sweet grass)
www.nrfirescience.org/resource/10921
This FEIS species review synthesizes information on the relationship of Hierochloe odorata (sweet grass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

Rudbeckia hirta (black-eyed Susan)
www.nrfirescience.org/resource/10918
This FEIS species review synthesizes information on the relationship of Rudbeckia hirta (black-eyed Susan) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

Bufo boreas (western toad)
www.nrfirescience.org/resource/10859
This FEIS species review synthesizes information on the relationship of Bufo boreas (western toad) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): Janet Sullivan
Year Published: 1994
Type: Document
Synthesis

**Bromus vulgaris (Columbia brome)**

www.nrfirescience.org/resource/10916

This FEIS species review synthesizes information on the relationship of Bromus vulgaris (Columbia brome) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

**Onsite sediment production and nutrient losses from a low-severity burn in the interior northwest**

www.nrfirescience.org/resource/11013

Postharvest residue burning is a common site preparation treatment used in the interior Northwest to reduce forest fuels and prepare sites for tree regeneration. A study was conducted to measure runoff, sediment production, and nutrient changes caused by broadcast burning of logging slash. The site was a northern Idaho mixed conifer...

Author(s): Peter R. Robichaud, Russell T. Graham, Roger D. Hungerford
Year Published: 1994
Type: Document
Conference Proceedings

**Fire regimes on andesitic mountain terrain in northeastern Yellowstone National Park, Wyoming**

www.nrfirescience.org/resource/8196

A fire history investigation was conducted for three forest community types in the Absaroka Mountains of Yellowstone National Park, Wyoming. Master fire chronologies were based on fire-initiated age classes and tree fire scars. The area's major forest type, lodgepole pine (Pinus contorta Dougl. var. latifolia) ecosystems, revealed a...

Author(s): Stephen W. Barrett
Year Published: 1994
Type: Document
Book or Chapter or Journal Article

**Chimaphila umbellata (prince's-pine)**

www.nrfirescience.org/resource/10772

This FEIS species review synthesizes information on the relationship of Chimaphila umbellata (prince's-pine) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Robin F. Matthews
Year Published: 1994
Type: Document
Synthesis

**Tympanuchus phasianellus (sharp-tailed grouse)**

www.nrfirescience.org/resource/10532

This FEIS species review synthesizes information on the relationship of Tympanuchus phasianellus...
(sharp-tailed grouse) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Julie L. Tesky
Year Published: 1994
Type: Document
Synthesis

Deschampsia elongata (slender hairgrass)
www.nrfirescience.org/resource/10645
This FEIS species review synthesizes information on the relationship of Deschampsia elongata (slender hairgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Lora L. Esser
Year Published: 1994
Type: Document
Synthesis

Comparisons of particulate-emissions and smoke impacts from presettlement, full suppression, and prescribed natural fire period in the Selway-Bitterroot Wilderness
www.nrfirescience.org/resource/8216
Total particulate matter (PM) emissions were estimated for recent fires (1979-1990) and the presettlement period (prior to 1935) in the Selway-Bitterroot Wilderness (SBW) in Idaho and Montana. Recent period emissions were calculated by 10-day periods for surface fire and crown fire based on estimates of percentage fuel consumption...

Author(s): James K. Brown, Larry S. Bradshaw
Year Published: 1994
Type: Document
Book or Chapter or Journal Article

Aquila chrysaetos (golden eagle)
www.nrfirescience.org/resource/10554
This FEIS species review synthesizes information on the relationship of Aquila chrysaetos (golden eagle) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Julie L. Tesky
Year Published: 1994
Type: Document
Synthesis

Agrostis stolonifera (creeping bentgrass)
www.nrfirescience.org/resource/10642
This FEIS species review synthesizes information on the relationship of Agrostis stolonifera (creeping bentgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Lora L. Esser
Year Published: 1994
Type: Document
Carex concinna (low northern sedge)
www.nrfirescience.org/resource/10925
This FEIS species review synthesizes information on the relationship of Carex concinna (low northern sedge) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

Bromus ciliatus (fringed brome)
www.nrfirescience.org/resource/10640
This FEIS species review synthesizes information on the relationship of Bromus ciliatus (fringed brome) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Lora L. Esser
Year Published: 1994
Type: Document
Synthesis

Falco sparverius (American kestrel)
www.nrfirescience.org/resource/10542
This FEIS species review synthesizes information on the relationship of Falco sparverius (American kestrel) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Julie L. Tesky
Year Published: 1994
Type: Document
Synthesis

Accipiter striatus (sharp-shinned hawk)
www.nrfirescience.org/resource/10519
This FEIS species review synthesizes information on the relationship of Accipiter striatus (sharp-shinned hawk) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Janet Sullivan
Year Published: 1994
Type: Document
Synthesis

Geranium richardsonii (Richardson's geranium)
www.nrfirescience.org/resource/10636
This FEIS species review synthesizes information on the relationship of Geranium richardsonii (Richardson's geranium) to fire--how fire affects the species and its habitat, and fire management
considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Lora L. Esser
Year Published: 1994
Type: Document
Synthesis

Solidago missouriensis (prairie goldenrod)
www.nrfirescience.org/resource/10917
This FEIS species review synthesizes information on the relationship of Solidago missouriensis (prairie goldenrod) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

Bromus pumpellianus (Pumpelly brome)
www.nrfirescience.org/resource/10915
This FEIS species review synthesizes information on the relationship of Bromus pumpellianus (Pumpelly brome) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

Blechnum spicant (deer fern)
www.nrfirescience.org/resource/10767
This FEIS species review synthesizes information on the relationship of Blechnum spicant (deer fern) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Aix sponsa (wood duck)
www.nrfirescience.org/resource/10849
This FEIS species review synthesizes information on the relationship of Aix sponsa (wood duck) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for fire...

Author(s): S. A. Snyder
Year Published: 1993
Type: Document
Synthesis
Oxytropis sericea (whitepoint locoweed)
www.nrfirescience.org/resource/10643
This FEIS species review synthesizes information on the relationship of Oxytropis sericea (whitepoint locoweed) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Lora L. Esser
Year Published: 1993
Type: Document
Synthesis

Lonicera utahensis (Utah honeysuckle)
www.nrfirescience.org/resource/10806
This FEIS species review synthesizes information on the relationship of Lonicera utahensis (Utah honeysuckle) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Diane S. Pavek
Year Published: 1993
Type: Document
Synthesis

Corydalis aurea (golden corydalis)
www.nrfirescience.org/resource/10762
This FEIS species review synthesizes information on the relationship of Corydalis aurea (golden corydalis) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Haliaeetus leucocephalus (bald eagle)
www.nrfirescience.org/resource/10843
This FEIS species review synthesizes information on the relationship of Haliaeetus leucocephalus (bald eagle) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): S. A. Snyder
Year Published: 1993
Type: Document
Synthesis

Castor canadensis (American beaver)
www.nrfirescience.org/resource/10547
This FEIS species review synthesizes information on the relationship of Castor canadensis (American beaver) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Iliamna rivularis (wild hollyhock)
www.nrfirescience.org/resource/10760
This FEIS species review synthesizes information on the relationship of Iliamna rivularis (wild hollyhock) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Lewisia rediviva (bitterroot)
www.nrfirescience.org/resource/10736
This FEIS species review synthesizes information on the relationship of Lewisia rediviva (bitterroot) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Delphinium bicolor (low larkspur)
www.nrfirescience.org/resource/10778
This FEIS species review synthesizes information on the relationship of Delphinium bicolor (low larkspur) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Marchantia polymorpha (liverwort)
www.nrfirescience.org/resource/10757
This FEIS species review synthesizes information on the relationship of Marchantia polymorpha (liverwort) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Taraxacum officinale (common dandelion)
This FEIS species review synthesizes information on the relationship of *Taraxacum officinale* (common dandelion) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...

Author(s): Lora L. Esser  
Year Published: 1993  
Type: Document  
Synthesis

### Trifolium repens (white clover)

This FEIS species review synthesizes information on the relationship of *Trifolium repens* (white clover) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Author(s): Milo Coladonato  
Year Published: 1993  
Type: Document  
Synthesis

### Equisetum sylvaticum (wood horsetail)

This FEIS species review synthesizes information on the relationship of *Equisetum sylvaticum* (wood horsetail) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Robin F. Matthews  
Year Published: 1993  
Type: Document  
Synthesis

### Pandion haliaetus (osprey)

This FEIS species review synthesizes information on the relationship of *Pandion haliaetus* (osprey) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...

Author(s): Julie L. Tesky  
Year Published: 1993  
Type: Document  
Synthesis

### Poa pratensis (Kentucky bluegrass)

This FEIS species review synthesizes information on the relationship of *Poa pratensis* (Kentucky bluegrass) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management...

Author(s): Ronald Uchytil  
Year Published: 1993
Lupinus sericeus (silky lupine)
www.nrfirescience.org/resource/10774
This FEIS species review synthesizes information on the relationship of Lupinus sericeus (silky lupine) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Rosa nutkana (Nootka rose)
www.nrfirescience.org/resource/10813
This FEIS species review synthesizes information on the relationship of Rosa nutkana (Nootka rose) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): William R. Reed
Year Published: 1993
Type: Document
Synthesis

Antennaria racemosa (raceme pussytoes)
www.nrfirescience.org/resource/10770
This FEIS species review synthesizes information on the relationship of Antennaria racemosa (raceme pussytoes) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Arnica cordifolia (heartleaf arnica)
www.nrfirescience.org/resource/10811
This FEIS species review synthesizes information on the relationship of Arnica cordifolia (heartleaf arnica) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): William R. Reed
Year Published: 1993
Type: Document
Synthesis

Antennaria microphylla (rosy pussytoes)
www.nrfirescience.org/resource/10768
This FEIS species review synthesizes information on the relationship of Antennaria microphylla (rosy
pussytoes) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

**Poa compressa (Canada bluegrass)**
www.nrfirescience.org/resource/10578
This FEIS species review synthesizes information on the relationship of Poa compressa (Canada bluegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Ronald Uchytil
Year Published: 1993
Type: Document
Synthesis

**Aralia nudicaulis (wild sarsaparilla)**
www.nrfirescience.org/resource/10808
This FEIS species review synthesizes information on the relationship of Aralia nudicaulis (wild sarsaparilla) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Diane S. Pavek
Year Published: 1993
Type: Document
Synthesis

**Claytonia perfoliata (miner's-lettuce)**
www.nrfirescience.org/resource/10763
This FEIS species review synthesizes information on the relationship of Claytonia perfoliata (miner's-lettuce) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

**Sorbus sitchensis (Sitka mountain-ash)**
www.nrfirescience.org/resource/10781
This FEIS species review synthesizes information on the relationship of Sorbus sitchensis (Sitka mountain-ash) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis
Amaranthus retroflexus (rough pigweed)

This FEIS species review synthesizes information on the relationship of Amaranthus retroflexus (rough pigweed) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...

Author(s): Roberta A. Walsh
Year Published: 1993
Type: Document
Synthesis

Picea pungens (blue spruce)

This FEIS species review synthesizes information on the relationship of Picea pungens (blue spruce) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...

Author(s): Diane S. Pavek
Year Published: 1993
Type: Document
Synthesis

Zigadenus paniculatus (foothill deathcamas)

This FEIS species review synthesizes information on the relationship of Zigadenus paniculatus (foothill deathcamas) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): Janet L. Howard
Year Published: 1993
Type: Document
Synthesis

Dracocephalum parviflorum (American dragonhead)

This FEIS species review synthesizes information on the relationship of Dracocephalum parviflorum (American dragonhead) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Linnaea borealis (twinflower)

This FEIS species review synthesizes information on the relationship of Linnaea borealis (twinflower) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This
Gymnocarpium dryopteris (oak fern)
www.nrfirescience.org/resource/10842
This FEIS species review synthesizes information on the relationship of Gymnocarpium dryopteris (oak fern) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): S. A. Snyder
Year Published: 1993
Type: Document
Synthesis

Cetraria islandica (Iceland moss)
www.nrfirescience.org/resource/10779
This FEIS species review synthesizes information on the relationship of Cetraria islandica (Iceland moss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Grindelia squarrosa (curlycup gumweed)
www.nrfirescience.org/resource/10922
This FEIS species review synthesizes information on the relationship of Grindelia squarrosa (curlycup gumweed) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Roberta A. Walsh
Year Published: 1993
Type: Document
Synthesis

Lycopodium annotinum (stiff clubmoss)
www.nrfirescience.org/resource/10759
This FEIS species review synthesizes information on the relationship of Lycopodium annotinum (stiff clubmoss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis
Phleum pratense (timothy)
www.nrfirescience.org/resource/10449
This FEIS species review synthesizes information on the relationship of Phleum pratense (timothy) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This...
Author(s): Lora L. Esser
Year Published: 1993
Type: Document
Synthesis

Solidago canadensis (Canada goldenrod)
www.nrfirescience.org/resource/10618
This FEIS species review synthesizes information on the relationship of Solidago canadensis (Canada goldenrod) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Milo Coladonato
Year Published: 1993
Type: Document
Synthesis

Delphinium occidentale (duncecap larkspur)
www.nrfirescience.org/resource/10777
This FEIS species review synthesizes information on the relationship of Delphinium occidentale (duncecap larkspur) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Lutra canadensis (northern river otter)
www.nrfirescience.org/resource/10538
This FEIS species review synthesizes information on the relationship of Lutra canadensis (northern river otter) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Julie L. Tesky
Year Published: 1993
Type: Document
Synthesis

Tortula ruralis (twisted moss)
www.nrfirescience.org/resource/10756
This FEIS species review synthesizes information on the relationship of Tortula ruralis (twisted moss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Robin F. Matthews
Vicia americana (American vetch)
www.nrfirescience.org/resource/10616
This FEIS species review synthesizes information on the relationship of Vicia americana (American vetch) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Milo Coladonato
Year Published: 1993
Type: Document
Synthesis

Lupinus caudatus (tailcup lupine)
www.nrfirescience.org/resource/10775
This FEIS species review synthesizes information on the relationship of Lupinus caudatus (tailcup lupine) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Ovis canadensis (bighorn sheep)
www.nrfirescience.org/resource/10536
This FEIS species review synthesizes information on the relationship of Ovis canadensis (bighorn sheep) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Julie L. Tesky
Year Published: 1993
Type: Document
Synthesis

Equisetum arvense (field horsetail)
www.nrfirescience.org/resource/10858
This FEIS species review synthesizes information on the relationship of Equisetum arvense (field horsetail) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Janet Sullivan
Year Published: 1993
Type: Document
Synthesis

Camassia quamash (common camas)
www.nrfirescience.org/resource/10724
This FEIS species review synthesizes information on the relationship of Camassia quamash (common camas) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Author(s): Janet L. Howard
Year Published: 1993
Type: Document
Synthesis

Peltigera aphthosa (green dog lichen)
www.nrfirescience.org/resource/10773
This FEIS species review synthesizes information on the relationship of Peltigera aphthosa (green dog lichen) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Rosa gymnocarpa (baldhip rose)
www.nrfirescience.org/resource/10814
This FEIS species review synthesizes information on the relationship of Rosa gymnocarpa (baldhip rose) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...

Author(s): William R. Reed
Year Published: 1993
Type: Document
Synthesis

Wyethia amplexicaulis (mules-ears)
www.nrfirescience.org/resource/10771
This FEIS species review synthesizes information on the relationship of Wyethia amplexicaulis (mules-ears) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Zenaida macroura (mourning dove)
www.nrfirescience.org/resource/10531
This FEIS species review synthesizes information on the relationship of Zenaida macroura (mourning dove) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): Julie L. Tesky
Year Published: 1993
Type: Document
Eurybia conspicua (showy aster)
www.nrfirescience.org/resource/10812
This FEIS species review synthesizes information on the relationship of Eurybia conspicua (showy aster) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): William R. Reed
Year Published: 1993
Type: Document
Synthesis

Ceratodon purpureus (fire moss)
www.nrfirescience.org/resource/10529
This FEIS species review synthesizes information on the relationship of Ceratodon purpureus (fire moss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

Chamerion angustifolium (fireweed)
www.nrfirescience.org/resource/10809
This FEIS species review synthesizes information on the relationship of Chamerion angustifolium (fireweed) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Diane S. Pavek
Year Published: 1992
Type: Document
Synthesis

Calamagrostis canadensis (bluejoint reedgrass)
www.nrfirescience.org/resource/10558
This FEIS species review synthesizes information on the relationship of Calamagrostis canadensis (bluejoint reedgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

Physocarpus malvaceus (ninebark)
www.nrfirescience.org/resource/10688
This FEIS species review synthesizes information on the relationship of Physocarpus malvaceus (ninebark) to fire--how fire affects the species and its habitat, and fire management considerations.
Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Author(s): James R. Habeck
Year Published: 1992
Type: Document
Synthesis

Effects of the Gates Park Fire on recreation choices
www.nrfirescience.org/resource/11094
The 1988 Gates Park Fire, along the North Fork of the Sun River in the Bob Marshall Wilderness, provided an opportunity to explore fire effects on wilderness visitor choices. Recreation visitors along the North and South Fork drainages were interviewed to assess the effects of 1988 fires on their 1989 visits. The Gates Park fire had...
Author(s): Timothy G. Love, Alan E. Watson
Year Published: 1992
Type: Document
Research Brief or Fact Sheet

Maianthemum stellatum (starry Solomon's-seal)
www.nrfirescience.org/resource/10686
This FEIS species review synthesizes information on the relationship of Maianthemum stellatum (starry Solomon's-seal) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): James R. Habeck
Year Published: 1992
Type: Document
Synthesis

Meleagris gallopavo (wild turkey)
www.nrfirescience.org/resource/10841
This FEIS species review synthesizes information on the relationship of Meleagris gallopavo (wild turkey) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): S. A. Snyder
Year Published: 1992
Type: Document
Synthesis

Salix monticola (mountain willow)
www.nrfirescience.org/resource/10639
This FEIS species review synthesizes information on the relationship of Salix monticola (mountain willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Lora L. Esser
Year Published: 1992
Type: Document
Synthesis
Medicago sativa (alfalfa)
www.nrfirescience.org/resource/10475
This FEIS species review synthesizes information on the relationship of Medicago sativa (alfalfa) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This...
Author(s): Janet Sullivan
Year Published: 1992
Type: Document
Synthesis

Menziesia ferruginea (menziesia)
www.nrfirescience.org/resource/10684
This FEIS species review synthesizes information on the relationship of Menziesia ferruginea (menziesia) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): James R. Habeck
Year Published: 1992
Type: Document
Synthesis

Hordeum jubatum (foxtail barley)
www.nrfirescience.org/resource/10539
This FEIS species review synthesizes information on the relationship of Hordeum jubatum (foxtail barley) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

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...
Author(s): Eini C. Lowell, Susan A. Willits, Robert L. Krahmer
Year Published: 1992
Type: Document
Technical Report or White Paper

Salix boothii (Booth willow)
www.nrfirescience.org/resource/10637
This FEIS species review synthesizes information on the relationship of Salix boothii (Booth willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
When it’s hot, it’s hot... or maybe it’s not! (Surface flaming may not portend extensive soil heating)

www.nrfirescience.org/resource/7939

Fire effects on a plant community, soil, and air are not apparent when judged only by surface fire intensity. The fire severity or fire impact can be described by the temperatures reached within the forest floor and the duration of heating experienced in the vegetation, forest floor, and underlying mineral soil.

Temporal...

Calamagrostis purpurascens (purple pinegrass)

www.nrfirescience.org/resource/10562

This FEIS species review synthesizes information on the relationship of Calamagrostis purpurascens (purple pinegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species...

Hylocomium splendens (splendid feather moss)

www.nrfirescience.org/resource/10530

This FEIS species review synthesizes information on the relationship of Hylocomium splendens (splendid feather moss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species...

Tsuga heterophylla (western hemlock)

www.nrfirescience.org/resource/10560

This FEIS species review synthesizes information on the relationship of Tsuga heterophylla (western hemlock) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species’ taxonomy, distribution, basic biology, and general management. This species review can be...
Rhamnus purshiana (cascara)
www.nrfirescience.org/resource/10691
This FEIS species review synthesizes information on the relationship of Rhamnus purshiana (cascara) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): James R. Habeck
Year Published: 1992
Type: Document
Synthesis

Pleurozium schreberi (Schreber's moss)
www.nrfirescience.org/resource/10528
This FEIS species review synthesizes information on the relationship of Pleurozium schreberi (Schreber's moss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

Fire ecology of the forest habitat types of eastern Idaho and western Wyoming
www.nrfirescience.org/resource/12116
This report summarizes the available fire ecology and management information relating to the forest habitat types of eastern Idaho and western Wyoming, west of the crest of the Wind River Mountain.
Author(s): Anne F. Bradley, William C. Fischer, Nonan V. Noste
Year Published: 1992
Type: Document
Technical Report or White Paper

Pinus ponderosa var. ponderosa (Pacific ponderosa pine)
www.nrfirescience.org/resource/10687
This FEIS species review synthesizes information on the relationship of Pinus ponderosa var. ponderosa (Pacific ponderosa pine) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This...
Author(s): James R. Habeck
Year Published: 1992
Type: Document
Synthesis

Pinus monticola (western white pine)
www.nrfirescience.org/resource/10663
This FEIS species review synthesizes information on the relationship of Pinus monticola (western white pine) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Randy Scott Griffith
Year Published: 1992
Type: Document
Luzula hitchcockii (smooth woodrush)
www.nrfirescience.org/resource/10685
This FEIS species review synthesizes information on the relationship of Luzula hitchcockii (smooth woodrush) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): James R. Habeck
Year Published: 1992
Type: Document

Achnatherum richardsonii (Richardson needlegrass)
www.nrfirescience.org/resource/10638
This FEIS species review synthesizes information on the relationship of Achnatherum richardsonii (Richardson needlegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Lora L. Esser
Year Published: 1992
Type: Document

Elymus trachycaulus (slender wheatgrass)
www.nrfirescience.org/resource/10722
This FEIS species review synthesizes information on the relationship of Elymus trachycaulus (slender wheatgrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Janet L. Howard
Year Published: 1992
Type: Document

Salix bebbiana (Bebb willow)
www.nrfirescience.org/resource/10563
This FEIS species review synthesizes information on the relationship of Salix bebbiana (Bebb willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document

Thuja plicata (western redcedar)
www.nrfirescience.org/resource/10561
This FEIS species review synthesizes information on the relationship of Thuja plicata (western redcedar) to fire--how fire affects the species and its habitat, and fire management considerations.
Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...

Agrostis scabra (ticklegrass)
www.nrfirescience.org/resource/10769
This FEIS species review synthesizes information on the relationship of Agrostis scabra (ticklegrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Robin F. Matthews
Year Published: 1992
Type: Document
Synthesis

Erodium cicutarium (cutleaf filaree)
www.nrfirescience.org/resource/10462
This FEIS species review synthesizes information on the relationship of Erodium cicutarium (cutleaf filaree) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): Janet L. Howard
Year Published: 1992
Type: Document
Synthesis

Athyrium filix-femina (lady fern)
www.nrfirescience.org/resource/10908
This FEIS species review synthesizes information on the relationship of Athyrium filix-femina (lady fern) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Crystal J. Walkup
Year Published: 1991
Type: Document
Synthesis

Picea glauca (white spruce)
www.nrfirescience.org/resource/10579
This FEIS species review synthesizes information on the relationship of Picea glauca (white spruce) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Fuel moisture as measured and predicted during the 1988 fires in Yellowstone National Park

Fine fuel moisture content, relative humidity, air temperature, and fire behavior were observed hourly for 48 hours on the North Fork Fire in Yellowstone National Park from August 25 to August 27, 1988. Fine fuel reached minimum moisture content of 3 to 5 percent late in the afternoon, remained below 8 percent until after midnight,...

Author(s): Roberta A. Hartford, Richard C. Rothermel
Year Published: 1991
Type: Document
Research Brief or Fact Sheet

The 1985 Butte fire in central Idaho: a Canadian perspective on the associated burning conditions

During the afternoon of August 29, 1985, the Butte Fire made a high-intensity crown fire run, covering a distance of 2.22 km in one hour and 40 minutes, and forcing 73 fire fighters to deploy their protective fire shelters. This paper presents a retrospective analysis of the fire behavior in terms of the two major subsystems of the...

Author(s): Martin E. Alexander
Year Published: 1991
Type: Document
Conference Proceedings, Technical Report or White Paper

Predicting behavior and size of crown fires in the northern Rocky Mountains

Assessment of crown fire conditions calls for two important judgments: (1) identifying conditions for the onset of severe fires, and (2) predicting the spread rate, intensity, and size of expected crown fires. This paper addresses the second problem and provides methods for making a first approximation of the behavior of a running...

Author(s): Richard C. Rothermel
Year Published: 1991
Type: Document
Technical Report or White Paper

Symphoricarpos mollis (creeping snowberry)

This FEIS species review synthesizes information on the relationship of Symphoricarpos mollis (creeping snowberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...

Author(s): S. A. Snyder
Year Published: 1991
Type: Document
Synthesis

Picea engelmannii (Engelmann spruce)

This FEIS species review synthesizes information on the relationship of Picea engelmannii (Engelmann spruce) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general
Influence of fire on factors that affect site productivity

Presettlement fire played an important role in nutrient conversion, plant succession, diversity, and stand dynamics in coniferous forests of western North America. Prescribed fire can maintain site quality and contribute to control of insect and disease problems while reducing wildfire hazard. Fire effects on soils are largely...

Author(s): Roger D. Hungerford, Michael G. Harrington, William H. Frandsen, Kevin C. Ryan, Gerald J. Niehoff
Year Published: 1991
Type: Document
Conference Proceedings, Technical Report or White Paper

Woody fuel and duff consumption by prescribed fire in northern Idaho mixed conifer logging slash

Describes results of prescribed burning 36 plots in northern Idaho mixed conifer logging slash. Fuel characteristics and methods for predicting duff and woody fuel consumption are reported. Guidelines are included for developing fire prescriptions.

Author(s): Elizabeth D. Reinhardt
Year Published: 1991
Type: Document
Technical Report or White Paper

Management and productivity of western-montane forest soils, proceedings

Includes 35 papers and six poster synopses presenting state-of-the-art knowledge on the nature and problems of integrating soils information and expertise into management of inland western forest resources. Papers emphasize regional information, but include data from world literature and previously unpublished material from regional...

Author(s): Alan E. Harvey, Leon F. Neuenschwander
Year Published: 1991
Type: Document
Conference Proceedings, Technical Report or White Paper

User's guide to version 2 of the Regeneration Establishment Model: part of the Prognosis Model

Version 2 of the Regeneration Establishment Model is part of version 6 of the Prognosis Model for Stand Development. The regeneration model predicts results of regeneration harvests for most site and stand conditions found in the Northern Rocky Mountains. The model is based on analysis of 12,128 1/300-acre plots sampled in forests...

Author(s): Dennis E. Ferguson, Nicholas L. Crookston
Year Published: 1991
Type: Document
Technical Report or White Paper
Salix geyeriana (Geyer willow)
www.nrfirescience.org/resource/10564
This FEIS species review synthesizes information on the relationship of Salix geyeriana (Geyer willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Ronald Uchytil
Year Published: 1991
Type: Document
Synthesis

Shepherdia canadensis (russet buffaloberry)
www.nrfirescience.org/resource/10909
This FEIS species review synthesizes information on the relationship of Shepherdia canadensis (russet buffaloberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Crystal J. Walkup
Year Published: 1991
Type: Document
Synthesis

Arctostaphylos uva-ursi (kinnikinnick)
www.nrfirescience.org/resource/10626
This FEIS species review synthesizes information on the relationship of Arctostaphylos uva-ursi (kinnikinnick) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Marilyn F. Crane
Year Published: 1991
Type: Document
Synthesis

Paxistima myrsinites (Oregon boxwood)
www.nrfirescience.org/resource/10850
This FEIS species review synthesizes information on the relationship of Paxistima myrsinites (Oregon boxwood) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): S. A. Snyder
Year Published: 1991
Type: Document
Synthesis

FTIR remote sensing of biomass burning emissions of CO2, CO, CH4, CH2O, NO, NO2, NH3, and N2O
www.nrfirescience.org/resource/8301
This work introduces remote sensing of biomass burning emissions using high-resolution Fourier transform infrared (FTIR) absorption spectroscopy over open paths in smoke plumes from biomass fires. There are several advantages to this type of smoke composition measurement, which address
some of the disadvantages of previous...
Author(s): David W. T. Griffith, William G. Mankin, Michael T. Coffey, Darold E. Ward, Allen R. Riebau
Year Published: 1991
Type: Document
Book or Chapter or Journal Article

Canis lupus (gray wolf)
www.nrfirescience.org/resource/10846
This FEIS species review synthesizes information on the relationship of Canis lupus (gray wolf) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): S. A. Snyder
Year Published: 1991
Type: Document
Synthesis

Postfire growth of Pseudotsuga menziesii and Pinus contorta in the Northern Rocky Mountains, USA
www.nrfirescience.org/resource/8253
Dendroecological methods were used to study the effects of wildfire on radial growth of Pseudotsuga menziesii (Douglas-fir) and Pinus contorta (lodgepole pine) in the northern Rocky Mountains. Mean basal area increment during a 4-year postfire period declined relative to prefire growth in 75% of burned P. menziesii trees and 70% of P...
Author(s): David L. Peterson, Michael J. Arbaugh, George H. Pollock, Lindsay J. Robinson
Year Published: 1991
Type: Document
Book or Chapter or Journal Article

Odocoileus virginianus (white-tailed deer)
www.nrfirescience.org/resource/10840
This FEIS species review synthesizes information on the relationship of Odocoileus virginianus (white-tailed deer) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): S. A. Snyder
Year Published: 1991
Type: Document
Synthesis

Betula papyrifera (paper birch)
www.nrfirescience.org/resource/10570
This FEIS species review synthesizes information on the relationship of Betula papyrifera (paper birch) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Ronald Uchytil
Year Published: 1991
Type: Document
Synthesis
Spiraea betulifolia (white spirea)
www.nrfirescience.org/resource/10683
This FEIS species review synthesizes information on the relationship of Spiraea betulifolia (white spirea) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): James R. Habeck
Year Published: 1991
Type: Document
Synthesis

Ursus arctos horribilis (grizzly bear)
www.nrfirescience.org/resource/10837
This FEIS species review synthesizes information on the relationship of Ursus arctos horribilis (grizzly bear) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): S. A. Snyder
Year Published: 1991
Type: Document
Synthesis

Salix planifolia (planeleaf willow)
www.nrfirescience.org/resource/10568
This FEIS species review synthesizes information on the relationship of Salix planifolia (planeleaf willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Ronald Uchytil
Year Published: 1991
Type: Document
Synthesis

The effect of fire on soil properties
www.nrfirescience.org/resource/12001
Fire affects nutrient cycling and the physical, chemical, and biological properties of soils occupied by western montane forests. Combustion of litter and soil organic matter (OM) increases the availability of some nutrients, although others are volatilized (for example, N, P, S). Soil OM loss also affects cation exchange capacity,...
Author(s): Leonard F. DeBano
Year Published: 1991
Type: Document
Conference Proceedings

Natural revegetation of burned and unburned clearcuts in western larch forests of northwest Montana
www.nrfirescience.org/resource/13293
In 1967 and 1968, seven south- and east-facing units, averaging 4-ha each, in a western larch forest of northwest Montana were (1) clearcut and burned by prescribed fire or wildfire, (2) clearcut and unburned, or (3) uncut and burned by wildfire. More than 20 years of forest succession data from
permanent transects show that fire...
Author(s): Raymond C. Shearer, Peter F. Stickney
Year Published: 1991
Type: Document
Conference Proceedings

Salix drummondiana (Drummond willow)
www.nrfirescience.org/resource/10566
This FEIS species review synthesizes information on the relationship of Salix drummondiana (Drummond willow) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Ronald Uchytil
Year Published: 1991
Type: Document
Synthesis

Bark beetle-fire associations in the greater Yellowstone area
www.nrfirescience.org/resource/12033
The large forest fires in and around Yellowstone National Park in 1988 bring up many ecological questions, including the role of bark beetles. Bark beetles may contribute to fuel buildup over the years preceding a fire, resulting in stand replacement fires. Fire is important to the survival of seral tree species and bark beetles...
Author(s): Gene D. Amman
Year Published: 1991
Type: Document
Synthesis, Technical Report or White Paper

Fire damage on extensively vs. intensively managed forest stands within the North Fork Fire, 1988
www.nrfirescience.org/resource/8342
The Greater Yellowstone fires of 1988 provide an opportunity to study important distinctions between lands managed for preservation versus multiple uses. We surveyed fuel loadings, fire severity, and fire damage to extensively managed, mature forest and to intensively managed, clearcut reproduction areas. Unburned, mature forests...
Author(s): Philip N. Omi, Kostas D. Kalabokidis
Year Published: 1991
Type: Document
Book or Chapter or Journal Article

Populus balsamifera subsp. balsamifera (balsam poplar)
www.nrfirescience.org/resource/10692
This FEIS species review synthesizes information on the relationship of Populus balsamifera subsp. balsamifera (balsam poplar) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This...
Author(s): Holly T. Harris
Year Published: 1990
Type: Document
Synthesis
Actaea rubra (red baneberry)
www.nrfirescience.org/resource/10625
This FEIS species review synthesizes information on the relationship of Actaea rubra (red baneberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Marilyn F. Crane
Year Published: 1990
Type: Document
Synthesis

Rubus idaeus (red raspberry)
www.nrfirescience.org/resource/10875
This FEIS species review synthesizes information on the relationship of Rubus idaeus (red raspberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): D. A. Tirmenstein
Year Published: 1990
Type: Document
Synthesis

Rosa acicularis (prickly rose)
www.nrfirescience.org/resource/10623
This FEIS species review synthesizes information on the relationship of Rosa acicularis (prickly rose) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): Marilyn F. Crane
Year Published: 1990
Type: Document
Synthesis

Vaccinium caespitosum (dwarf bilberry)
www.nrfirescience.org/resource/10871
This FEIS species review synthesizes information on the relationship of Vaccinium caespitosum (dwarf bilberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): D. A. Tirmenstein
Year Published: 1990
Type: Document
Synthesis

Xerophyllum tenax (beargrass)
www.nrfirescience.org/resource/10621
This FEIS species review synthesizes information on the relationship of Xerophyllum tenax (beargrass) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Taxus brevifolia (Pacific yew)
www.nrfirescience.org/resource/10890
This FEIS species review synthesizes information on the relationship of Taxus brevifolia (Pacific yew) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): D. A. Tirmenstein
Year Published: 1990
Type: Document
Synthesis

Vaccinium parvifolium (red huckleberry)
www.nrfirescience.org/resource/10888
This FEIS species review synthesizes information on the relationship of Vaccinium parvifolium (red huckleberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): D. A. Tirmenstein
Year Published: 1990
Type: Document
Synthesis

Simulating cumulative fire effects in ponderosa pine/Douglas-fir forests
www.nrfirescience.org/resource/8262
A successional process model has been adapted for use with species from ponderosa pine/Douglas-fir (Pinus ponderosa var. ponderosa)/(Pseudotsuga menziesii var. glauca) forests of the inland Northwest. Its design allows modification for application to other forest types. This model, FIRESUM, simulates tree establishment, growth, and...
Author(s): Robert E. Keane, Stephen F. Arno, James K. Brown
Year Published: 1990
Type: Document
Book or Chapter or Journal Article

Erythronium grandiflorum (glacier lily)
www.nrfirescience.org/resource/10932
This FEIS species review synthesizes information on the relationship of Erythronium grandiflorum (glacier lily) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can...
Author(s): Tara Y. Williams
Year Published: 1990
Type: Document
Synthesis

Pteridium aquilinum (western bracken fern)
www.nrfirescience.org/resource/10624
This FEIS species review synthesizes information on the relationship of Pteridium aquilinum (western bracken fern) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Marilyn F. Crane
Year Published: 1990
Type: Document
Synthesis

Vaccinium myrtillus (dwarf bilberry)
www.nrfirescience.org/resource/10872
This FEIS species review synthesizes information on the relationship of Vaccinium myrtillus (dwarf bilberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): D. A. Tirmenstein
Year Published: 1990
Type: Document
Synthesis

Selaginella densa (little spikemoss)
www.nrfirescience.org/resource/10622
This FEIS species review synthesizes information on the relationship of Selaginella densa (little spikemoss) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): Marilyn F. Crane
Year Published: 1990
Type: Document
Synthesis

Predicting equilibrium moisture content of some foliar forest litter in the northern Rocky Mountains
www.nrfirescience.org/resource/11964
Forest foliage that comprises much of the forest floor litter has higher equilibrium moisture content, EMC, than woody components. The EMC's at 300 °K were found to increase as follows: grasses...
Author(s): Hal E. Anderson
Year Published: 1990
Type: Document
Technical Report or White Paper

Effects of fire retardant on water quality
www.nrfirescience.org/resource/11139
Ammonium-based fire retardants are important in managing wildfires, but their use can adversely affect water quality. Their entry, fate, and impact were studied in five forest streams. Initial retardant concentrations in water approached levels which could damage fish, but no distressed fish were found. Concentrations decreased...
Author(s): Logan A. Norris, Warren L. Webb
Year Published: 1989
Type: Document
Firesum-an ecological process model for fire succession in western conifer forests

www.nrfirescience.org/resource/11917
Describes an ecological process model of succession that simulates long-term stand dynamics in forests of the Northern Rocky Mountains. This model is used to evaluate the effects of various fire regimes, including prescribed burning and fire suppression, on the vegetation and fuel complex of a simulation stand. This report documents...
Author(s): Robert E. Keane, Stephen F. Arno, James K. Brown
Year Published: 1989
Type: Document
Technical Report or White Paper

Salix lucida subsp. lasiandra (Pacific willow)

www.nrfirescience.org/resource/10577
This FEIS species review synthesizes information on the relationship of Salix lucida subsp. lasiandra (Pacific willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

The effects of fire on watersheds: a summary

www.nrfirescience.org/resource/11049
Over the past three days we have been presented with the results of a most impressive quantity and quality of research on the effects of fire on watersheds. My attempt to summarize these papers will hardly do them justice, but hopefully will recapitulate some of their more important and generalizable findings. My comments are...
Author(s): Nicholas Dennis
Year Published: 1989
Type: Document
Conference Proceedings

Alnus rubra (red alder)

www.nrfirescience.org/resource/10571
This FEIS species review synthesizes information on the relationship of Alnus rubra (red alder) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...
Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

Salix lutea (yellow willow)

www.nrfirescience.org/resource/10567
This FEIS species review synthesizes information on the relationship of Salix lutea (yellow willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is
also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used for...

Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

Vegetation response to helicopter logging and broadcast burning in Douglas-fir habitat types at Silver Creek, central Idaho
www.nrfirescience.org/resource/11963
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

Sambucus nigra subsp. cerulea (blue elderberry)
www.nrfirescience.org/resource/10628
This FEIS species review synthesizes information on the relationship of Sambucus nigra subsp. cerulea (blue elderberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species...
Author(s): Marilyn F. Crane
Year Published: 1989
Type: Document
Synthesis

Rubus ursinus (trailing blackberry)
www.nrfirescience.org/resource/10876
This FEIS species review synthesizes information on the relationship of Rubus ursinus (trailing blackberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be...
Author(s): D. A. Tirmenstein
Year Published: 1989
Type: Document
Synthesis

Salix lemmonii (Lemmons willow)
www.nrfirescience.org/resource/10575
This FEIS species review synthesizes information on the relationship of Salix lemmonii (Lemmons willow) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Alnus viridis subsp. sinuata (Sitka alder)
www.nrfirescience.org/resource/10572
This FEIS species review synthesizes information on the relationship of Alnus viridis subsp. sinuata (Sitka alder) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

Rubus laciniatus (evergreen blackberry)
www.nrfirescience.org/resource/10478
This FEIS species review synthesizes information on the relationship of Rubus laciniatus (evergreen blackberry) to fire--how fire affects the species and its habitat, invasiveness of the species, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general...
Author(s): D. A. Tirmenstein
Year Published: 1989
Type: Document
Synthesis

Rubus spectabilis (salmonberry)
www.nrfirescience.org/resource/10889
This FEIS species review synthesizes information on the relationship of Rubus spectabilis (salmonberry) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review can be used...
Author(s): D. A. Tirmenstein
Year Published: 1989
Type: Document
Synthesis

Polystichum munitum (western sword fern)
www.nrfirescience.org/resource/10627
This FEIS species review synthesizes information on the relationship of Polystichum munitum (western sword fern) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general management. This species review...
Author(s): Marilyn F. Crane
Year Published: 1989
Type: Document
Synthesis

Andropogon gerardii (big bluestem)
www.nrfirescience.org/resource/10573
This FEIS species review synthesizes information on the relationship of Andropogon gerardii (big bluestem) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the species' taxonomy, distribution, basic biology, and general
Comparative vegetational recovery on firelines cleared with explosives and with handtools
www.nrfirescience.org/resource/11932
Vegetational recovery was compared on firelines constructed in three ground fuel cover types, using conventional hand tools and two types of fireline explosives. Measurement of ground coverage of shrub and herb species before and after disturbance indicated similar vegetational recover on blasted and hand-dug fireline.
Author(s): Timothy E. Paysen, Richard J. Barney
Year Published: 1987
Type: Document

Fire ecology of western Montana forest habitat types
www.nrfirescience.org/resource/11257
Provides information on fire as an ecological factor for forest habitat types in western Montana. Identifies Fire Groups of habitat types based on fire's role in forest succession. Describes forest fuels and suggests considerations for fire management.
Author(s): William C. Fischer, Anne F. Bradley
Year Published: 1987
Type: Document

Forest fire frequency and western spruce budworm outbreaks in western Montana
www.nrfirescience.org/resource/7908
Duration and intensity of western spruce budworm (Christoneura occidentalis Freeman) outbreaks have increased with the decrease in forest fire frequency in Montana since 1910. Frequency of budworm outbreaks, however, was not affected. Feeding activity and fire occurrence were measured in 20 mixed Douglas-fir (Pseudotsuga menziesii...)
Author(s): Leslie Anderson, Clinton E. Carlson, Ronald H. Wakimoto
Year Published: 1987
Type: Document

Fire response of shrubs of dry forest habitat types in Montana and Idaho
www.nrfirescience.org/resource/11916
This paper contains information from diverse sources on the regeneration capabilities, response to fire, and utilization of shrub species important or common to dry forest habitat types in Montana and Idaho. Response to fire is classified by reproductive strategies and how the species persists in the stand. Utility of the species...
Author(s): Nonan V. Noste, Charles L. Bushey
Year Published: 1987
Type: Document

Guide to understory burning in ponderosa pine-larch-fir forests in the Intermountain West
www.nrfirescience.org/resource/11255
Summarizes the objectives, prescriptions, and techniques used in prescribed burning beneath the canopy of ponderosa pine stands, and stands of ponderosa pine mixed with western larch, Douglas-fir, and grand fir. Information was derived from 12 districts in two USDA Forest Service Regions and seven National Forests in Montana and...
Author(s): Bruce M. Kilgore, George A. Curtis
Year Published: 1987
Type: Document
Technical Report or White Paper

First decade plant succession following the Sundance forest fire, northern Idaho
www.nrfirescience.org/resource/11915
Describes the first 10 years of vegetation development following disturbance by a holocaustic forest fire in a western redcedar-western hemlock type in the Selkirk Range. Postfire development of vegetation is represented as life-form stages and predominant cover species. Differential development of plant species established in the...
Author(s): Peter F. Stickney
Year Published: 1986
Type: Document
Technical Report or White Paper

Prescribed fire opportunities in grasslands invaded by Douglas-fir: state-of-the-art guidelines
www.nrfirescience.org/resource/11259
Provides information on use of prescribed fire to enhance productivity of bunchgrass ranges that have been invaded by Douglas-fir. Six vegetative "situations" representative of treatment opportunities most commonly encountered in Montana are discussed. Included are fire prescription considerations and identification of the resource...
Author(s): George E. Gruell, James K. Brown, Charles L. Bushey
Year Published: 1986
Type: Document
Technical Report or White Paper

Surface fuel loadings and predicted fire behavior for vegetation types in the northern Rocky Mountains
www.nrfirescience.org/resource/11930
Means, standard deviations, and quartiles of fuel loadings were determined for litter, for downed woody material of 0 to one-fourth inch, one-fourth to 1 inch, 0 to 1 inch, and 1 to 3 inches, for herbaceous vegetation, and for shrubs by cover types and fire groups. The studies were conducted at four locations in northwestern Wyoming...
Author(s): James K. Brown, Collin D. Bevins
Year Published: 1986
Type: Document
Research Brief or Fact Sheet

Fire ecology of the forest habitat types of central Idaho
www.nrfirescience.org/resource/11258
Discusses fire as an ecological factor for forest habitat types occurring in central Idaho. Identifies "Fire Groups" of habitat types based on fire's role in forest succession. Considerations for fire management are suggested.
Author(s): Marilyn F. Crane, William C. Fischer
Year Published: 1986
Fire's effects on a small bird population
www.nrfirescience.org/resource/11188
Changes in bird populations as a result of a 122 ha forest fire are evaluated. There is little evidence of any drastic effect on numbers of birds, species, or species diversity in the year of the fire or 2 years later.
Author(s): L. Jack Lyon, John M. Marzluff
Year Published: 1985
Type: Document
Technical Report or White Paper

Crown scorch volume and scorch height: estimates of postfire tree condition
www.nrfirescience.org/resource/8385
In salvage operations after wildfire, timber managers need to identify those trees most likely to die. Crown scorch volume and scorch height are commonly used to estimate damage to conifers after fire. Calculated crown scorch volume based on scorch height and tree dimensions was compared with observed crown scorch volume for four...
Author(s): David L. Peterson
Year Published: 1985
Type: Document
Book or Chapter or Journal Article

Influence of fire severity on response of evergreen ceanothus
www.nrfirescience.org/resource/11061
Fire plays an important role in Ceanothus velutinus habitat. Its impact varies with season and severity of fire. Knowledge of the interaction between fire severity and evergreen ceanothus habitat can assist managers in estimating the effect of fire on evergreen ceanothus and in developing burning prescriptions.
Author(s): Nonan V. Noste
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

Timber net value and physical output changes following wildfire in the northern rocky mountains: estimates for specific fire situations
www.nrfirescience.org/resource/11219
In the last decade, the fire management program of the Forest Service, U.S. Department of Agriculture, has come under closer scrutiny because of ever-rising program costs. The Forest Service has responded by conducting several studies analyzing the economic efficiency of its fire management program. Some components of the analytical...
Author(s): Patrick J. Flowers, Patricia B. Shinkle, Daria A. Cain, Thomas J. Mills
Year Published: 1985
Type: Document
Technical Report or White Paper

Fire ecology of antelope bitterbrush in the Northern Rocky Mountains
www.nrfirescience.org/resource/11058
Frequency of resprouting and number of newly established seedlings of antelope bitterbrush were
sampled on sites burned by prescribed burns and wildfires 3 to 10 years previously to determine the effect of habitat type, growth form, and season of the burn on bitterbrush. Significant differences in resprouting response occurred among...

Author(s): Stephen C. Bunting, Leon F. Neuenschwander, George E. Gruell
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

A summary of ponderosa pine (Pinus ponderosa) management activities in the Lick Creek Drainage of the Bitterroot National Forest
www.nrfirescience.org/resource/13371
The objective of thesis was to summarize 80 years of changes associated with several cutting regimes in the Lick Creek Drainage. The Lick Creek Drainage was first selectively cut in 1906, followed by several commercial and precommercial thinnings occurring in the late 1950's through the early 1980's. Permanent...
Author(s): James P. Menakis
Year Published: 1985
Type: Document
Dissertation or Thesis

Fire, logging, and white-tailed deer interrelationships in the Swan Valley, northwestern Montana
www.nrfirescience.org/resource/11056
The historical importance of fire was investigated on the upper Swan Valley winter white-tailed deer range in northwestern Montana. The relatively recent impacts of logging on winter range quality were also included in these studies. Fire exclusion has led to successional development of once open-canopied mature seral forests, and...
Author(s): June D. Freedman, James R. Habeck
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

Data base for early postfire succession on the Sundance Burn, northern Idaho
www.nrfirescience.org/resource/11914
Provides baseline data on secondary plant succession and the development of plant species and life forms for the initial 6 to 15 years following a stand-replacing forest fire in the western redcedar-western hemlock type in northern Idaho. Information pertaining to plant cover (m2/0.01 ha) and volume of space occupied (m3/0.01 ha) is...
Author(s): Peter F. Stickney
Year Published: 1985
Type: Document
Technical Report or White Paper

Watershed modeling for fire management planning in the Northern Rocky Mountains
www.nrfirescience.org/resource/11220
Water yield and sediment production almost always increase after wildfire has destroyed vegetative cover. The value of water generally is not as much appreciated in the water-rich northern Rocky Mountains as it is elsewhere. Increased water yield becomes economically beneficial, however, when its potential for consumptive and...
Author(s): Donald F. Potts, David L. Peterson, Hans R. Zuuring
Year Published: 1985
Type: Document
Influence of fire on curlleaf mountain-mahogany in the Intermountain West
www.nrfirescience.org/resource/11059
Comprehensive sampling of curlleaf mountain-mahogany (Cercocarpus ledifolius) on 41 sites in five States allowed an assessment of postfire population dynamics, differences in regeneration patterns, and critical events in stand regeneration. Historical accounts of fire, fire history studies, and early photographs provided historical...
Author(s): George E. Gruell, Stephen C. Bunting, Leon F. Neuenschwander
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

Bighorn sheep and fire: seven case histories
www.nrfirescience.org/resource/11057
Responses of seven bighorn sheep populations and habitats to prescribed fire and wildfire in southern British Columbia, Idaho, and Glacier National Park ranged from no influence to increase; interacting factors such as lungworm infection, livestock grazing, and reduction in forage overrode potential benefits of subsequent increases...
Author(s): James M. Peek, Raymond A. Demarchi, Dennis A. Demarchi
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

Estimating postfire changes in production and value of northern rocky mountain-intermountain rangelands
www.nrfirescience.org/resource/11222
A simulation model was developed to estimate postfire changes in the production and value of grazing lands in the Northern Rocky Mountain-Intermountain region. Ecological information and management decisions were used to simulate expected changes in production and value after wildfire in six major rangeland types: permanent forested...
Author(s): David L. Peterson, Patrick J. Flowers
Year Published: 1984
Type: Document
Technical Report or White Paper

Characteristics of fireline blasted with linear explosives: initial test results
www.nrfirescience.org/resource/11929
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

Modeling behavior of prescribed fires in Yosemite National Park
www.nrfirescience.org/resource/8313
The National Fire Danger Rating System and the Fire Behavior Prediction System were tested on prescribed fires burning underneath canopies in six fuel types in Yosemite National Park, California. The
The error for rate of spread was +0.03 foot per minute for the NFDRS and -0.15 foot for the FBPS. For flame length factors...

Livestock grazing influences on community structure, fire intensity, and fire frequency within the Douglas-fir/ninebark habitat type

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...

Early postfire revegetation in a western Montana Douglas-fir forest

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.

Fire ecology of Montana forest habitat types east of the Continental Divide

Provides information on fire as an ecological factor for forest habitat types occurring east of the Continental Divide in Montana. Identifies "Fire Groups" of habitat types based on fire's role in forest succession. Describes forest fuels and suggests considerations for fire management.

Fire and vegetative trends in the Northern Rockies: interpretations from 1871-1982 photographs

Interprets changes in forest and range vegetation resulting from the absence of fire. Eighty-six matched photographs covering the period 1871-1982 provide the basis for describing how vegetation has changed in various plant communities. These scenes show that woody vegetation has increased markedly as a result of reduced wildfire....
Variation in estimates of fire intervals: a closer look at fire history on the Bitterroot National Forest

www.nrfirescience.org/resource/11958

The authors examine variation in the length of mean intervals between fires (occurring between the years 1600 and 1910) in sample units of various sizes, ranging from a point on the ground (single tree) to a large stand (200 to 800 acres; 80 to 320 hectares). Recommendations are made regarding appropriate sizes of sample units for...

Author(s): Stephen F. Arno, Terry D. Petersen
Year Published: 1982
Type: Document
Technical Report or White Paper

Indian fires as an ecological influence in the Northern Rockies

www.nrfirescience.org/resource/7910

The importance of fire as an ecological disturbance in the Northern Rockies is well accepted. Lightning is generally thought to have been the main source of ignition prior to settlement by Europeans. But writings of explorers and pioneers mention deliberate burning by Indians frequently enough to warrant an investigation of its...

Author(s): Stephen W. Barrett, Stephen F. Arno
Year Published: 1982
Type: Document
Book or Chapter or Journal Article

Downed and dead woody fuel and biomass in the northern Rocky Mountains

www.nrfirescience.org/resource/11881

Weights and volumes of downed woody material in diameter classes of one-fourth to 1, 1 to 3, and greater than 3 inches and forest floor duff depths were summarized from extensive inventories in northern Idaho and Montana. Biomass loadings are shown by cover types and habitat types within National Forests. Total downed woody biomass...

Author(s): James K. Brown, Thomas E. See
Year Published: 1981
Type: Document
Technical Report or White Paper

Residue characteristics in the Northern Rocky Mountains

www.nrfirescience.org/resource/11131

ANNOTATION: In the northern Rocky Mountains, 350-450 million cubic feet (9.9 to 12.7 million cubic meters) of logging residue is generated each year. Up to 60 percent of the residue material is technologically suitable for wood products, but condition, size and product potential vary among forest types. Other factors which influence...

Author(s): Robert E. Benson, Joyce A. Schlieter
Year Published: 1981
Type: Document
Conference Proceedings, Technical Report or White Paper

Clearcutting and fire in the larch/Douglas-fir forests of western Montana: a multifaceted research summary

www.nrfirescience.org/resource/11180

Logging slash on 73 clearcuts was broadcast burned over a wide range of conditions, achieving a broad array of fire intensities and effects. An intense wildfire was also evaluated. Fire effectiveness was measured and related to preburn conditions and fire intensity. Treatment effects on air quality, forest
Intensive utilization with conventional harvesting systems

www.nrfirescience.org/resource/11130

ANNOTATION: Forest residues utilization research has included case studies of the efficiency of existing harvesting systems in achieving close fiber utilization. Field evaluations included the use of in-woods chipping systems in gentle terrain; crawler skidder systems in gentle terrain; and skyline systems in steep terrain. In each...

Author(s): Roland L. Barger, Robert E. Benson
Year Published: 1981
Type: Document
Conference Proceedings, Technical Report or White Paper

Photo guide for appraising downed woody fuels in Montana forests: Interior ponderosa pine, ponderosa pine - larch - Douglas-fir, larch - Douglas-fir, and interior Douglas-fir cover types

www.nrfirescience.org/resource/11263

Four series of color photographs show different levels of downed woody material resulting from natural processes in four forest cover types in Montana. Each photo is supplemented by fuel inventory data and potential fire behavior ratings.

Author(s): William C. Fischer
Year Published: 1981
Type: Document
Technical Report or White Paper

Effects of prescribed fire on soil nitrogen levels in a cutover Douglas-fir/western larch forest

www.nrfirescience.org/resource/11956

The effects of a prescribed broadcast fire on soil nitrogen (N) levels and related soil properties were determined following the clearcutting of a 250-year-old Douglas-fir/western larch stand in northwestern Montana. Soil N losses from burning amounted to slightly over 90 lb/acre (100 kg/ha), all from the surface organic layers....

Author(s): Martin F. Jurgensen, Alan E. Harvey, Michael J. Larsen
Year Published: 1981
Type: Document
Technical Report or White Paper

Fire’s influence on wildlife habitat on the Bridger-Teton National Forest, Wyoming - Volume II: changes and causes, management implications

www.nrfirescience.org/resource/12126

Provides information on wildlife habitat condition and trend on the Bridger-Teton National Forest in the Jackson Hole Region of Wyoming by analysis of broad plant communities. Visual evidence of condition and trend are provided in Volume I, The Photo Record. Management implications are included.

Author(s): George E. Gruell
Year Published: 1980
Type: Document
Technical Report or White Paper
Fire ecology of Lolo National Forest habitat types

This report summarizes available information on fire as an ecological factor for forest habitat types occurring on the Lolo National Forest. The Lolo National Forest habitat types are grouped into 10 Fire Groups based primarily on fire's role in forest succession. For each Fire Group, information is presented on (1) the relationship...

Author(s): Kathleen M. Davis, Bruce D. Clayton, William C. Fischer
Year Published: 1980
Type: Document
Technical Report or White Paper

Fire history of a western larch/Douglas-fir forest type in northwestern Montana

Mean frequencies were about 120 years for valleys and montane slopes and 150 years for subalpine slopes in this western larch/Douglas-fir forest from 1735 to 1976. Fires were small and moderately intense with occasional high intensity runs. Single burns thinned the overstory favoring mixed conifer regeneration. Multiple burns...

Author(s): Kathleen M. Davis
Year Published: 1980
Type: Document
Conference Proceedings, Technical Report or White Paper

Postharvest residue burning under alternative silvicultural practices

Prescribed burning of logging slash was done in clearcut, overstory removal, and understory cutting units in a Douglas-fir stand on the Lubrecht Experimental Forest near Missoula, Mont. The burning prescriptions and actual burning conditions are described. Data on preharvest, post-harvest, and postburn conditions are reported.

Author(s): Robert W. Steele
Year Published: 1980
Type: Document
Research Brief or Fact Sheet

Light burning and the nutrient value of forage

Slash burning in a clearcut under conditions producing very light to light burn intensities (....

Author(s): Nellie M. Stark
Year Published: 1980
Type: Document
Research Brief or Fact Sheet

Effects of fire on nitrogen in forest floor horizons

The effects of burning no nitrogen (N) losses and transformations in red pine (Pinus resinosa Ait.), eastern hemlock [Tsuga canadensis (L.) Carr.], and Douglas-fir (Pseudotsuga menziesii) western larch (Larix occidentalis Nutt.) forest floor were investigated. Organic horizon samples were burned at 400°C for 30 min in a top-heating...

Author(s): G. D. Mroz, Martin F. Jurgensen, Alan E. Harvey, Michael J. Larsen
Year Published: 1980
Type: Document
Book or Chapter or Journal Article
Forest fire history in the Northern Rockies

Recent fire-scar studies in the northern Rocky Mountains have documented forest fire history over the past few centuries. They reveal that in some forest types fire maintained many-aged open stands of seral trees. In other types, major fires caused replacement of the stands. Often, however, fires burned at variable intensities....

Author(s): Stephen F. Arno
Year Published: 1980
Type: Document
Book or Chapter or Journal Article

Fire's influence on wildlife habitat on the Bridger-Teton National Forest, Wyoming - Volume I: photographic record and analysis

The Bridger-Teton National Forest in the Jackson Hole Region of Wyoming has long been recognized for its wildlife resource. Management efforts have emphasized the measurement of forage utilization by elk (Cervus canadensis nelsoni) and their effect on summer and winter ranges. Less consideration has been given to other biotic and...

Author(s): George E. Gruell
Year Published: 1980
Type: Document
Technical Report or White Paper

Indian fires in the pre-settlement forests of western Montana

Presents preliminary results of a two-year study examining the pattern of Indian fires in western Montana's lower elevation forests. Interviews and historic journals were used to reconstruct the characteristics of aboriginal burning. Fire scar data from paired stands indicate substantial differences in fire frequency between Indian...

Author(s): Stephen W. Berrett
Year Published: 1980
Type: Document
Conference Proceedings

Damage from logging and prescribed burning in partially cut Douglas-fir stands

Damage from tractor logging and slash burning in a Douglas-fir stand on gentle terrain was measured for three different types of timber harvesting. Logging damage was light in the selection-cut and understory-removal cutting units. In the overstory-removal unit, about 11 percent of the leave trees were killed by logging. Little...

Author(s): Robert E. Benson
Year Published: 1980
Type: Document
Research Brief or Fact Sheet

A review of some interactions between harvesting, residue management, fire, and forest insects and diseases

Many species of insects and diseases create residues that predispose forests to fire. Conversely,
natural factors such as fire, wind-throw, and other agents create forest residues that predispose forests to diseases and insects, including bark and cambium beetles, wood borers, and others. Man-made residues also predispose forests to...

Author(s): David G. Fellin
Year Published: 1979
Type: Document
Technical Report or White Paper

**Weight and density of crowns of Rocky Mountain conifers**

www.nrfirescience.org/resource/11205

ANNOTATION: Relationships between live and dead crown weight and DBH, crown length, tree height, and crown ratio are presented for 11 Rocky Mountain conifers. Also included are partitioned estimates of crown foliage and branchwood. This study shows a high correlation between DBH and crown weight.

Author(s): James K. Brown
Year Published: 1978
Type: Document
Technical Report or White Paper

**Predicting slash depth for fire modeling**

www.nrfirescience.org/resource/11954

Development of equations for predicting fuel bed depth (called "bulk depth" herein) appropriate for modeling fire behavior in slash is described. Bulk depth (y) was correlated with the expected number of 1/4-to 1-inch-diameter particle intercepts per foot of vertical plane transect (x) by regressions of the form y = a\cdot x. Values of "...

Author(s): Frank A. Albini, James K. Brown
Year Published: 1978
Type: Document
Technical Report or White Paper

**Effects of burning moist fuels on seedbed preparation in cutover western larch forests**

www.nrfirescience.org/resource/11955

In early September 1975, two clearcuts (14 and 17 acres; 5.7 and 6.9 ha), two sets of 4 small clearcuts (1.5 acres; 0.6 ha each), and one shelterwood cutting (22 acres; 8.9 ha) were broadcast burned principally for seedbed preparation and fuel reduction on the Coram Experimental Forest. The objective was to develop a model for...

Author(s): Donald K. Artley, Raymond C. Shearer, Robert W. Steele
Year Published: 1978
Type: Document
Technical Report or White Paper

**The fire history of Coram Experimental Forest**

www.nrfirescience.org/resource/13148

This thesis documents the fire history and assesses the role of fire in the western larch/Douglas-fir forest of the Coram Experimental Forest in northwestern Montana. Primary attention was given to the frequency, areal spread, relative severity, and effects of fires prior to the advent of active suppression efforts in order to...

Author(s): Kathy M. Sneck
Year Published: 1977
Type: Document
Dissertation or Thesis
Nutrient content of forest shrubs following burning

www.nrfirescience.org/resource/8151
Prescribed burning under mature Larch/Douglas-fir forests produced changes in elemental uptake. Elemental analyses of individual species and existing biomass three years post-burn from hot, medium, and lightly burned sites and unburned controls showed a significant shift in species composition with burn intensity. Few species from...

Author(s): Nellie M. Stark, R. Steel
Year Published: 1977
Type: Document
Book or Chapter or Journal Article

Pre-feasibility assessment: small diameter underutilized (SDU) wood feedstock for a 10 MW co-generation facility at the Milltown dam site

www.nrfirescience.org/resource/11206
ANNOTATION: A pre-feasibility assessment is an early stage and limited analysis of the probable risks and returns of an investment. Focused on gathering preliminary information, it helps decision makers determine if there is a basis for investing additional capital and time in the proposed project. This pre-feasibility assessment to...

Author(s): James K. Brown, J. A. Kendall Snell, David L. Bunnell
Year Published: 1977
Type: Document
Technical Report or White Paper

A method for determining fire history in coniferous forests in the Mountain West

www.nrfirescience.org/resource/11176
An improved version is presented of a method previously used [see FA 40, 169]. Instructions are given for: laying out transects; gathering stand data, including documenting fire-scarred trees; sampling fire-scarred trees; laboratory analysis of tree cross-sections; correlating fire chronologies; and calculating fire frequency. The...

Author(s): Stephen F. Arno, Kathy M. Sneck
Year Published: 1977
Type: Document
Technical Report or White Paper

Response of blue huckleberry to prescribed fires in a western Montana larch-fir forest

www.nrfirescience.org/resource/11952
In a western larch/Douglas-fir forest type in western Montana, 9 spring and 11 fall under story burns were conducted. Multiple regression equations related the number of Vaccinium globulare (blue huckleberry) stems present 1 and 2 years after fire to the number present before fire, prefire fuel loadings, moisture content of fuel,...

Author(s): Melanie Miller
Year Published: 1977
Type: Document
Technical Report or White Paper

Fire and nutrient cycling in a Douglas-fir/larch forest

www.nrfirescience.org/resource/8136
Twenty control burns performed with a wide range of fuel loadings and moisture conditions were used to study the effectiveness of old fuel reduction under standing Douglas-fir/larch forest. This paper reports the influence of burning on nutrient retention and loss from the soil. Sixty % of the fires were
successful in reducing...
Author(s): Nellie M. Stark
Year Published: 1977
Type: Document
Book or Chapter or Journal Article

The historical role of fire on the Bitterroot National Forest
www.nrfirescience.org/resource/11175
Presents frequencies, intensities, and influences of fire on stand structure and composition on the Bitterroot National Forest in west-central Montana. Three study areas were established, each having a wide range of elevations and forest types. Findings are based upon study of nearly 900 individual fire scars on living trees, and on...
Author(s): Stephen F. Arno
Year Published: 1976
Type: Document
Technical Report or White Paper

Broadcast burning in larch-fir clearcuts: the Miller Creek-Newman Ridge study
www.nrfirescience.org/resource/11950
Seventy-three clearcuts in western larch/Douglas-fir forests of western Montana were broadcast burned over a wide range of environmental conditions for the purpose of quantifying fire characteristics and burn accomplishment. The moisture content of the upper duff, and the National Fire-Danger Rating System Buildup Index (1964) were...

Author(s): William R. Beaufait, Charles E. Hardy, William C. Fischer
Year Published: 1975
Type: Document
Technical Report or White Paper

Wildland fires and dwarf mistletoes: a literature review of ecology and prescribed burning
www.nrfirescience.org/resource/12412
Wildfires play a multiple role in the distribution of dwarf mistletoes - they may either inhibit or encourage these parasites depending primarily on the size and intensity of the burn. Many reports suggest that fire exclusion policies of the past half century have resulted in increased dwarf mistletoe levels as, well as increased...

Author(s): Martin E. Alexander, Frank G. Hawksworth
Year Published: 1975
Type: Document
Synthesis, Technical Report or White Paper

Lodgepole pine logging residues: management alternatives
www.nrfirescience.org/resource/12125
The dollar and nondollar effects of alternative levels of residue utilization in mature lodgepole pine are compared. Net dollar returns were greater in conventional logging (removal of green sawlogs to a 6-inch top, with slash piled and burned) than in near-complete harvesting (sawlog removal followed by field chipping of remaining... 

Author(s): Robert E. Benson
Year Published: 1974
Type: Document
Technical Report or White Paper

Inventory of slash fuels using 3P subsampling
www.nrfirescience.org/resource/11906
A recent large-scale study of prescribed broadcast burning in western Montana required the development of a system for inventory of clearcut logging slash furls before and after fire treatment. The system is best suited for inventorying material which tends to be oriented parallel to the ground. The inventory system uses line...

Author(s): William R. Beaufait, Michael A. Marsden, Rodney A. Norum
Year Published: 1974
Type: Document
Technical Report or White Paper

Fire-dependent forests in the Northern Rocky Mountains
www.nrfirescience.org/resource/7935
One objective of wilderness and parkland fire ecology research is to describe the relationships between fire and unmanaged ecosystems, so that strategies can be determined that will provide a more nearly natural incidence of fire. More than 50 years of efforts directed toward exclusion of wildland fires in the Northern Rocky...

Author(s): James R. Habeck, Robert W. Mutch
Year Published: 1973
Type: Document
The ecological role of fire in natural conifer forests of western and northern North America
www.nrfirescience.org/resource/7940
Contains an introductory paper by the editors, and, in addition to papers separately noticed [see the next three abstracts], the following: Fire in the virgin forests of the Boundary Waters Canoe Area, Minnesota (M.L. Heinselman, 99 ref.); The importance of fire as a natural ecological factor in Itasca State Park, Minnesota (S.S....
Author(s): Miron L. Heinselman, Herbert E. Wright
Year Published: 1973
Type: Document
Book or Chapter or Journal Article

Field test of a rate-of-fire-spread model in slash fuels
www.nrfirescience.org/resource/11945
Predicted rates of fire spread using a mathematical model were consistently greater but in reasonably close agreement with rates observed on test fires in ponderosa pine and Douglas-fir slash. Fuel loading, bulk density, particle density, particle surface-to-volume ratio, heat content, total plant salt content, silica-free salt,...
Author(s): James K. Brown
Year Published: 1972
Type: Document
Technical Report or White Paper

Vegetal development following prescribed burning of Douglas-fir in south-central Idaho
www.nrfirescience.org/resource/12124
In 1966, preliminary results of this study were reported by Lyon in Research Paper INT-29, Initial Vegetal Development Following Prescribed Burning of Douglas-fir in South-Central Idaho. Because of a misplaced decimal point in that report, data for density and volume of shrubs 2 years after the fire are incorrect. Although the...
Author(s): L. Jack Lyon
Year Published: 1971
Type: Document
Technical Report or White Paper

The seasonal trends in moisture content, ether extractives, and energy of ponderosa pine and Douglas-fir needles
www.nrfirescience.org/resource/11943
The moisture, ether extractive, and energy content of ponderosa pine (Pinus ponderosa Laws.) and Douglas-fir (Pseudotsuga menziesii L.) foliage were measured during two fire seasons. The moisture content of 1- and 2-year-old needles was found to rise throughout the summer. The ether extractive content was highest in the fir foliage...
Author(s): Charles W. Philpot, Robert W. Mutch
Year Published: 1971
Type: Document
Technical Report or White Paper

Airborne infrared forest fire detection system: final report
www.nrfirescience.org/resource/11942
This work was undertaken because of a mutual interest of the Department of Defense, Advanced
Research Projects Agency (ARPA), and the USDA Forest Service in the problems of detecting hot targets against natural terrain backgrounds using airborne infrared (IR) line scanning instrumentation. The study objectives were broadly defined...

Author(s): Ralph A. Wilson, Stanley N. Hirsch, Forrest H. Madden, John B. Losensky
Year Published: 1971
Type: Document
Technical Report or White Paper

**Vertical distribution of fuel in spruce-fir logging slash**
www.nrfirescience.org/resource/11941
About 70 percent of the volume and surface area of spruce-fir logging slash lies below the mid-depth of the slash. Material 0 to 1 centimeter in diameter was distributed vertically in the same proportions as all other material. Old slash in the first 20 centimeters above the ground contained a higher proportion of large material...

Author(s): James K. Brown
Year Published: 1970
Type: Document
Technical Report or White Paper

**Seedbed treatments influence seedling development in western larch forests**
www.nrfirescience.org/resource/13145
Studies in 12- to 15- year- old western larch stands at Coram Experimental Forest in northwestern Montana show that condition of the seedbed at the time of seedling establishment strongly influences seedling development. Larch regenerates abundantly, grows rapidly, and becomes dominant where prescribed burning or mechanical...

Author(s): Wyman C. Schmidt
Year Published: 1969
Type: Document
Technical Report or White Paper

**Tree-bole ignition in superimposed lightning scars**
www.nrfirescience.org/resource/11921
This Note presents observations on a little-known mode of tree-bole ignition by lightning in which a fire-setting discharge partially superimposes its furrow upon an older lightning soar and causes ignition in the older injury.

Author(s): Alan R. Taylor
Year Published: 1969
Type: Document
Research Brief or Fact Sheet

**Sundance Fire: an analysis of fire phenomena**
www.nrfirescience.org/resource/11229
The Sundance Fire on September 1, 1967, made a spectacular run of 16 miles in 9 hours and destroyed more than 50,000 acres. This run became the subject of a detailed research analysis of the environmental, topographic, and vegetation variables aimed at reconstructing and describing fire phenomena. This report details the fire's...

Author(s): Hal E. Anderson
Year Published: 1968
Type: Document
Technical Report or White Paper
Mechanisms of fire spread research progress report no. 2
www.nrfirescience.org/resource/11937
In 1961 the National Science Foundation awarded grants to Washington State University and the Northern Forest Fire Laboratory of the Intermountain Forest and Range Experiment Station to further a joint study of the mechanisms of fire spread in wildland fuels. The combined efforts of the two research groups encompass theoretical...
Author(s): Hal E. Anderson
Year Published: 1966
Type: Document
Technical Report or White Paper

Project fire scan: fire detection interim report, April 1962 to December 1964
www.nrfirescience.org/resource/11935
The original program objectives were to develop and test a heat-sensitive system capable of: (1) locating small fires, (2) mapping fire perimeters, and (3) measuring rates of fire spread. The usefulness of infrared mappers was to be examined by surveillance of fire sources in forest environments. The capability for locating fire...
Author(s): Ralph A. Wilson, Nonan V. Noste
Year Published: 1966
Type: Document
Technical Report or White Paper

Death in Blackwater Canyon
www.nrfirescience.org/resource/11494
On August 21, 1937, the tragic Blackwater Fire caused the death of 15 firefighters, burning approximately 1,700 acres of National Forest System lands on the Shoshone National Forest, near Cody, Wyoming. An electrical storm occurred in the general vicinity of Blackwater Creek on Wednesday, August 18th causing a fire, which was not...
Author(s): Erle Kauffman
Year Published: 1937
Type: Document
Book or Chapter or Journal Article

Fuel treatment for patch clear cuts on the Sloan-Venally timber sale
www.nrfirescience.org/resource/12797
The goal of this project is to ensure that post harvest 0-3 inch fuel loading, on the patch clear cuts within the Sloan-Kennally timber sale, will be in compliance with Forest Service Manual - 5100, Payette National Forest Supplement 5100-93-1, standards. In order to meet this goal the existing 0-3 inch fuel loading on the...
Author(s): Tyler Bentley
Type: Document
Management or Planning Document, Technical Report or White Paper

Culturally peeled trees handbook
www.nrfirescience.org/resource/12391
This guide was developed to help identify Culturally Peeled Trees. Culturally Peeled Trees are a specific type of Culturally Modified Tree. The term is used to describe the mostly pre-reservation practice by aboriginal or native people of 'peeling,' or removing, the bark/cambium layer of a tree for a variety of procurement and...
Author(s): Marcy Reiser, Laurie S. Huckaby
Positive effects of fire on birds may appear only under narrow combinations of fire severity and time-since-fire
www.nrfirescience.org/resource/14589
We conducted bird surveys in 10 of the first 11 years following a mixed-severity fire in a dry, low-elevation mixed-conifer forest in western Montana, United States. By defining fire in terms of fire severity and time-since-fire, and then comparing detection rates for species inside 15 combinations of fire severity and time-since-fire...
Author(s): Richard L. Hutto, David A. Patterson
Type: Document
Book or Chapter or Journal Article