Wildfire recovery as a “hot moment” for creating fire-adapted communities
www.nrfirescience.org/resource/21002
Recent decades have witnessed an escalation in the social, economic, and ecological impacts of wildfires worldwide. Wildfire losses stem from the complex interplay of social and ecological forces at multiple scales, including global climate change, regional wildfire regimes altered by human activities, and locally managed wildland-...
Author(s): Ronald L. Schumann, Miranda H. Mockrin, Alexandra D. Syphard, Joshua Whittaker, Owen F. Price, Cassandra Johnson-Gaither, Christopher T. Emrich, Van Butsic
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Repeated fire altered succession and increased fire behavior in basin big sagebrush–native perennial grasslands
www.nrfirescience.org/resource/21319
The structure and composition of sagebrush-dominated ecosystems have been altered by changes in fire regimes, land use, invasive species, and climate change. This often decreases resilience to disturbance and degrades critical habitat for species of conservation concern. Basin big sagebrush (Artemisia tridentata ssp. tridentata)... Author(s): Lisa M. Ellsworth, J. Boone Kauffman, Schyler A. Reis, David B. Sapsis, Kendra Moseley
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Is fire always the "bad guy"?
www.nrfirescience.org/resource/21644
Much distortion about the real role of fire in different ecosystems exists, mostly because fire events attract media attention, usually focusing on the negative aspects of fire. In the perception of the general public, fire events are usually linked to disasters that affect humans in several ways, from losses of lives to negative...
Author(s): Alessandra Fidelis
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Rethinking fire-adapted species in an altered fire regime
www.nrfirescience.org/resource/20919
Novel combinations of fire regime and forest type are emerging in areas affected by climate change, fire exclusion, and other stressors. Species interactions following wildfire in these areas are not well understood. In Sierra Nevada mixed-conifer forests, large patches of stand-replacing fire were once rare but are becoming...
Author(s): Carmen L. Tubbesing, Robert A. York, Scott L. Stephens, John J. Battles
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Classification of Post-Fire Responses of Woody Plants to include Pyrophobic Communities
www.nrfirescience.org/resource/21274
Developing standardised classification of post-fire responses is essential for globally consistent comparisons of woody vegetation communities. Existing classification systems are based on responses of species growing in fire-prone environments. To accommodate species that occur in rarely burnt...
Good fire, bad fire: it depends on who burns
www.nrfirescience.org/resource/21632
Fire can be extremely harmful to sensitive ecosystems such as rainforests while maintaining the structure and composition of savanna environments. That is because historically, rainforest species have not been subjected to recurring fires requiring physiological and structural survival adaptations. In savannas, in turn, fire is a...
Author(s): Christian N. Berlinck, Eugênia Kelly Luciano Batista
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Adaptive prescribed burning in Australia for the early 21st Century – context, status, challenges
www.nrfirescience.org/resource/21271
Despite evident advances in knowledge and understanding concerning the application of prescribed burning for delivering benefits in wildfire control and a variety of sociocultural, economic and environmental outcomes, the practical application of prescribed burning in Australia is increasingly administratively and logistically...
Author(s): Jeremy Russell-Smith, Lachlan McCaw, Adam J. Leavesley
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Influence of topography and fuels on fire refugia probability under varying fire weather conditions in forests of the Pacific Northwest, USA
www.nrfirescience.org/resource/21597
Fire refugia—locations that burn less severely or less frequently than surrounding areas—support late-successional and old-growth forest structure and function. This study investigates the influence of topography and fuels on the probability of forest fire refugia under varying fire weather conditions. We focused on recent large...
Author(s): Garrett W. Meigs, Christopher J. Dunn, Sean A. Parks, Meg A. Krawchuk
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Can Mowing Substitute for Fire in Semiarid Grassland?
www.nrfirescience.org/resource/20746
Accumulating data indicate the importance of fire in rangeland systems. Mowing is a common management technique sometimes considered a surrogate for fire. However, direct comparisons of fire and mowing effects are limited. Our objective was to determine whether mowing can substitute for fire in rangeland by comparing effects on...
Author(s): Lance T. Vermeire, Dustin J. Strong, Emily A. Gates, Clayton B. Marlow, Richard C. Waterman
Year Published: 2020
Type: Document
Book or Chapter or Journal Article
Proceedings of the Fire Continuum-Preparing for the future of wildland fire
www.nrfirescience.org/resource/21579
The Fire Continuum Conference, co-sponsored by the Association for Fire Ecology and the International Association of Wildland Fire, was designed to cover both the biophysical and human dimensions aspects of fire along the fire continuum. This proceedings includes many of topics covered during the conference - including pre-fire...
Author(s): Sharon M. Hood, Stacy Drury, Toddi A. Steelman, Ron Steffens
Year Published: 2020
Type: Document
Conference Proceedings

 Integrating functional connectivity and fire management for better conservation outcomes
www.nrfirescience.org/resource/21516
Globally, the mean abundance of terrestrial animals has fallen by 50% since 1970, and populations face ongoing threats associated with habitat loss, fragmentation, climate change and disturbance. Climate change can influence the quality of remaining habitat directly, and indirectly by precipitating increases in the extent, frequency...
Author(s): Holly Sitters, Julian Di Stefano
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

 Effects of fire on grassland soils and water: A review
www.nrfirescience.org/resource/21447
Grasslands occur on all of the continents. They collectively constitute the largest ecosystem in the world, making up 40.5% of the terrestrial land area, excluding Greenland and Antarctica. Grasslands are not entirely natural because they have formed and developed under natural and anthropogenic pressures. Their importance now is to...
Author(s): Daniel G. Neary, Jackson M. Leonard
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

 The effects of fire on the thermal environment of sagebrush communities
www.nrfirescience.org/resource/21083
Thermal heterogeneity provides options for organisms during extreme temperatures that can contribute to their fitness. Sagebrush (Artemisia spp.) communities exhibit vegetation heterogeneity that creates thermal variation at fine spatial scales. However, fire can change vegetation and thereby variation within the thermal environment...
Author(s): Christopher R. Anthony, Christian A. Hagen, Katie M. Dugger, R. Dwayne Elmore
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

 Disturbance history modulates how litter and herbaceous cover influence conifer regeneration after fire
www.nrfirescience.org/resource/21417
Climate-driven increases in disturbance frequency and extent augment the potential for compounded disturbances. Drawing on well-studied forests that experienced successive disturbances, we asked: (1)
how does post-fire cover of litter, herbaceous cover and bare ground vary between stands affected by combinations of blow-down, insect...
Author(s): Nathan S. Gill, Daniel Jarvis, John Rogan, Dominik Kulakowski
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Fire and distance from unburned forest influence bird assemblages in Southern Andean Yungas of Northwest Argentina: a case study
www.nrfirescience.org/resource/21412
Background: Wildfires affect vegetation structure, functions, and other attributes of forest ecosystems. Among these attributes, bird assemblages may be influenced by the distance from undisturbed to fire-disturbed forests. Information about this influence is essential for designing management plans aimed at conserving birds’...
Author(s): Adriana Marisel Morales, Natalia Politi, Luis Osvaldo Rivera, Constanza Guadalupe Vivanco, Guillermo E. Defosse
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Fuel treatment longevity in ponderosa pine-dominated forest 24 years after cutting and prescribed burning
www.nrfirescience.org/resource/21655
... 
Author(s): Sharon M. Hood, Christopher R. Keyes, Katelynn J. Bowen, Duncan C. Lutes, Carl A. Seielstad
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Temporal and energetic drivers of seed resource use by Clark’s nutcracker, keystone seed disperser of coniferous forests
www.nrfirescience.org/resource/20923
Clark's nutcracker (Nucifraga columbiana) functions as a keystone seed disperser and ecological mobile link for many western conifers. The bird is the primary seed disperser for limber pine (Pinus flexilis), which is an important seed resource for the bird. In the Southern Rocky Mountains, annual variation in limber pine cone...
Author(s): Tyler J. Williams, Diana F. Tomback, Nels Grevstad, Kristin Broms
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Forest disturbances affect functional groups of macrofungi in young successional forests - harvests and fire lead to different fungal assemblages
www.nrfirescience.org/resource/21288
Fungal assemblages after a large-scale disturbance can be diverse and have functionally important roles in forests. However, fungi include several functional groups, and the responses of these groups to different forest disturbances is poorly understood. For example, ectomycorrhizal fungi may facilitate the establishment of a new...
Author(s): Jari Kouki, Kauko Salo
Year Published: 2020
Resilience to large, 'catastrophic' wildfires in North America's grassland biome

Wildfires are ecosystem-level drivers of structure and function in many vegetated biomes. While numerous studies have emphasized the benefits of fire to ecosystems, large wildfires have also been associated with the loss of ecosystem services and shifts in vegetation abundance. The size and number of wildfires are increasing...

Author(s): Victoria M. Donovan, Dirac Twidwell, Daniel R. Uden, Tsegaye Tadesse, Brian D. Wardlow, Christine H. Bielski, Matthew O. Jones, Brady W. Allred, David E. Naugle, Craig R. Allen
Year Published: 2020

Repeated fire altered succession and increased fire behavior in basin big sagebrush–native perennial grasslands

The structure and composition of sagebrush-dominated ecosystems have been altered by changes in fire regimes, land use, invasive species, and climate change. This often decreases resilience to disturbance and degrades critical habitat for species of conservation concern. Basin big sagebrush (Artemisia tridentata ssp. tridentata)...

Author(s): Lisa M. Ellsworth, J. Boone Kauffman, Schyler A. Reis, David B. Sapsis, Kendra Moseley
Year Published: 2020

Fine-scale fire patterns mediate forest structure in frequent-fire ecosystems

In frequent-fire forests, wildland fire acts as a self-regulating process creating forest structures that consist of a fine-grained mosaic of isolated trees, tree groups of various sizes, and non-treed openings. Though the self-regulation of forest structure through repeated fires is acknowledged, few studies have...

Author(s): Scott M. Ritter, Chad M. Hoffman, Michael A. Battaglia, Camille Stevens-Rumann, William E. Mell
Year Published: 2020

Biogeography of fire regimes in western U.S. conifer forests: A trait-based approach

Aim: Functional traits are a crucial link between species distributions and the ecosystem processes that structure those species' niches. Concurrent increases in the availability of functional trait data and our ability to model species distributions present an opportunity to develop functional trait biogeography (i.e., the...
Restoration applications of resource objective wildfires in western US forests: a status of knowledge review
www.nrfirescience.org/resource/21580
Background: Frequent-fire forests of the western United States have undergone remarkable changes in structure, composition, and function due to historical exclusion of naturally occurring fire. Mechanized tree thinning to reduce forest density and fuel loads tends to be expensive and cannot be effectively implemented across all...  
Author(s): David W. Huffman, John Paul Roccaforte, Judith D. Springer, Joseph E. Crouse  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

Wildfire-driven forest conversion in western North American landscapes
www.nrfirescience.org/resource/21525
Changing disturbance regimes and climate can overcome forest ecosystem resilience. Following high-severity fire, forest recovery may be compromised by lack of tree seed sources, warmer and drier postfire climate, or short-interval reburning. A potential outcome of the loss of resilience is the conversion of the prefire forest to a...  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

Bridging the research-management gap: landscape science in practice on public lands in the western United States
www.nrfirescience.org/resource/21211
Context: Landscape science relies on foundational concepts of landscape ecology and seeks to understand the physical, biological, and human components of ecosystems to support land management decision-making. Incorporating landscape science into land management decisions, however, remains challenging. Many lands in the western...  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article

Development of post-fire vegetation response-ability model in grassland mountainous ecosystem using GIS and remote sensing
www.nrfirescience.org/resource/21458
The mountainous grassland ecosystem in Golden Gate National Park (South Africa) has post-fire ecological resilience. However, vegetation species composition and structure can alter when the ecosystem continually has uncontrolled fires. This study developed a vegetation response-ability model by integrating environmental factors (...  
Author(s): Efosa G. Adagbasa, Samuel A. Adelabu, Tom W. Okello  
Year Published: 2020  
Type: Document  
Book or Chapter or Journal Article
Predator responses to fire: a global systematic review and meta-analysis
www.nrfirescience.org/resource/21121
Knowledge of how disturbances such as fire shape habitat structure and composition, and affect animal interactions, is fundamental to ecology and ecosystem management. Predators also exert strong effects on ecological communities, through top-down regulation of prey and competitors, which can result in trophic cascades. Despite...
Author(s): William L. Geary, Tim S. Doherty, Dale G. Nimmo, Ayesha I. T. Tulloch, Euan G. Ritchie
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Disturbance refugia within mosaics of forest fire, drought, and insect outbreaks
www.nrfirescience.org/resource/21429
Disturbance refugia – locations that experience less severe or frequent disturbances than the surrounding landscape – provide a framework to highlight not only where and why these biological legacies persist as adjacent areas change but also the value of those legacies in sustaining biodiversity. Recent studies of disturbance...
Author(s): Meg A. Krawchuk, Garrett W. Meigs, Jennifer Cartwright, Jonathan D. Coop, Raymond J. Davis, Andrés Holz, Crystal A. Kolden, Arjan J. H. Meddens
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Small-scale water deficits after wildfires create long-lasting ecological impacts
www.nrfirescience.org/resource/21078
Ecological droughts are deficits in soil–water availability that induce threshold-like ecosystem responses, such as causing altered or degraded plant-community conditions, which can be exceedingly difficult to reverse. However, 'ecological drought' can be difficult to define, let alone to quantify, especially at spatial and...
Author(s): Rory O'Connor, Matthew J. Germino, David M Barnard, Caitlin M. Andrews, John Bradford, David S. Pilliod, Robert S. Arkle, Robert K. Shriver
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

The influence of pre-fire growth patterns on post-fire tree mortality for common conifers in western US parks
www.nrfirescience.org/resource/21414
Fire severity in forests is often defined in terms of post-fire tree mortality, yet the influences on tree mortality following fire are not fully understood. Pre-fire growth may serve as an index of vigour, indicating resource availability and the capacity to recover from injury and defend against pests. For trees that are not...
Author(s): Phillip J. van Mantgem, Donald A. Falk, Emma C. Williams, Adrian J. Das, Nathan L. Stephenson
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

As wildfires flare up across West, research highlights risk of ecological change
One of Jonathan Coop's first vivid memories as a child was watching the flames of the 1977 La Mesa Fire in north-central New Mexico. The human-caused fire burned more than 15,000 acres of pine forests in the Bandelier National Monument and areas surrounding the Los Alamos National Laboratory. Now a forest ecologist and professor at...

The survival of Pinus ponderosa saplings subjected to increasing levels of fire behavior and impacts on post-fire growth

Improved predictions of tree species mortality and growth metrics following fires are important to assess fire impacts on forest succession, and ultimately forest growth and yield. Recent studies have shown that North American conifers exhibit a ‘toxicological dose-response’ relationship between fire behavior and the resultant...

Author(s): Wade D. Steady, Raquel Partelli Feltrin, Daniel M. Johnson, Aaron M. Sparks, Crystal A. Kolden, Alan F. Talhelm, James A. Lutz, Luigi Boschetti, Andrew T. Hudak, Andrew S. Nelson, Alistair M. S. Smith
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Whitebark and Foxtail Pine in Yosemite, Sequoia, and Kings Canyon National Parks: Initial Assessment of Stand Structure and Condition

The Inventory & Monitoring Division of the U.S. National Park Service conducts long-term monitoring to provide park managers information on the status and trends in biological and environmental attributes including white pines. White pines are foundational species in many subalpine ecosystems and are currently experiencing...

Author(s): Jonathan C. B. Nesmith, Micah Wright, Erik S. Jules, Shawn T. McKinney
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Feast not famine: Nitrogen pools recover rapidly in 25?yr?old postfire lodgepole pine

The extent of young postfire conifer forests is growing throughout western North America as the frequency and size of high?severity fires increase, making it important to understand ecosystem structure and function in early seral forests. Understanding nitrogen (N) dynamics during postfire stand development is especially important...

Author(s): Monica G. Turner, Timothy G. Whitby, William H. Romme
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Use of landscape simulation modeling to quantify resilience for ecological applications

Goals of fostering ecological resilience are increasingly used to guide U.S. public land management in the context of anthropogenic climate change and increasing landscape disturbances. There are, however, few operational means of assessing the resilience of a landscape or ecosystem. We present
Living on the edge: trailing edge forests at risk of fire? facilitated conversion to non?forest
www.nrfirescience.org/resource/19625
Forests are an incredibly important resource across the globe, yet they are threatened by climate change through stressors such as drought, insect outbreaks, and wildfire. Trailing edge forests—those areas expected to experience range contractions under a changing climate—are of particular concern because of the potential for...
Author(s): Sean A. Parks, Solomon Z. Dobrowski, John D. Shaw, Carol Miller
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Understory vascular plant responses to retention harvesting with and without prescribed fire
www.nrfirescience.org/resource/20122
Wildfire is the predominant natural disturbance in the boreal forests of western Canada. Natural disturbance-based forest management involves the use of retention harvesting to retain stand structural diversity post-harvest; however, this partial harvesting technique does not cause combustion of the forest floor as does fire....
Author(s): Caroline Mary Adrianne Franklin, Scott E. Nielsen, S. Ellen Macdonald
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Sage advice for managers: a new, collaborative science framework for conservation and restoration of the sagebrush biome
www.nrfirescience.org/resource/19551
The two-part Science Framework for Conservation and Restoration of the Sagebrush Biome published by the U.S. Forest Service Rocky Mountain Research Station is a new, multi-scale approach to management of sagebrush ecosystems. The product of an extensive collaboration between State and Federal agencies and universities, it employs...
Author(s): Susan Miller
Year Published: 2019
Type: Document
Research Brief or Fact Sheet

Post-fire vegetation communities in western Colorado
www.nrfirescience.org/resource/20877
Wildfire is a cause of disturbance on public lands, and post-fire treatments often include broadcast seeding of native and non-native seeds. We collected vegetation data from an area burned by a wildfire in western Colorado in 2012 and, where available, compared pre- and post-fire data. We sought to determine how dominant plant...
Author(s): M Nikki Grant-Hoffman, James Dollerschell
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
Fire deficits have increased drought sensitivity in dry conifer forests: Fire frequency and tree?ring carbon isotope evidence from Central Oregon

www.nrfirescience.org/resource/19508

A century of fire suppression across the Western United States has led to more crowded forests and increased competition for resources. Studies of forest thinning or stand conditions after mortality events have provided indirect evidence for how competition can promote drought stress and predispose forests to severe fire and/or bark...

Author(s): Steven L. Voelker, Andrew G. Merschel, Frederick C. Meinzer, Danielle E. M. Ulrich, Thomas A. Spies, Christopher J. Still
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Wild bee diversity increases with local fire severity in a fire-prone landscape

www.nrfirescience.org/resource/19428

As wildfire activity increases in many regions of the world, it is imperative that we understand how key components of fire?prone ecosystems respond to spatial variation in fire characteristics. Pollinators provide a foundation for ecological communities by assisting in the reproduction of native plants, yet our understanding of...

Author(s): Sara M. Galbraith, James H. Cane, Andrew R. Moldenke, James W. Rivers
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A unified framework for plant life-history strategies shaped by fire and herbivory

www.nrfirescience.org/resource/20554

Fire and herbivory both remove aboveground biomass. Environmental factors determine the type and intensity of these consumers globally, but the traits of plants can also alter their propensity to burn and the degree to which they are eaten. To understand plant life?history strategies associated with fire and herbivory we need to...

Author(s): Sally Archibald, Gareth P. Hempson, Caroline E. R. Lehmann
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Belowground community responses to fire: meta?analysis reveals contrasting responses of soil microorganisms and mesofauna

www.nrfirescience.org/resource/19216

Global fire regimes are shifting due to climate and land use changes. Understanding the responses of belowground communities to fire is key to predicting changes in the ecosystem processes they regulate. We conducted a comprehensive meta?analysis of 1634 observations from 131 empirical studies to investigate the effect of fire on...

Author(s): Yamina Pressler, John C. Moore, M. Francesca Cotrufo
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Does burn severity affect plant community diversity and composition in mixed conifer forests of the United States Intermountain West one decade post fire?
Background: Wildfire is an important ecological process in mixed conifer forests of the Intermountain West region of the USA. However, researchers and managers are concerned because climate warming has led to increased fire activity in recent decades. More area burned will result in larger land areas in early successional stages and...

Author(s): Eva K. Strand, K.L. Satterberg, Andrew T. Hudak, John C. Byrne, Azad Henareh Khalyani, Alistair M. S. Smith
Year Published: 2019
Type: Document

Soil characteristics are associated with gradients of big sagebrush canopy structure after disturbance

Reestablishing shrub canopy cover after disturbance in semi-arid ecosystems, such as sagebrush steppe, is essential to provide wildlife habitat and restore ecosystem functioning. While several studies have explored the effects of landscape and climate factors on the success or failure of sagebrush seeding, the influence of soil...

Author(s): David M Barnard, Matthew J. Germino, Robert S. Arkle, John Bradford, Michael C. Duniway, David S. Pilliod, David A. Pyke, Robert K. Shriver, Justin L. Welty
Year Published: 2019
Type: Document

Future fire scenarios: predicting the effect of fire management strategies on the trajectory of high-quality habitat for threatened species

Prescribed (or 'planned') burning is used by land managers to reduce fuel-loads in order to mitigate the spread of wildfire, thereby protecting life and property, and to promote environmental heterogeneity to enhance biodiversity. Globally, many fire management agencies focus on increasing extent and frequency of prescribed burning...

Author(s): Jemima Connell, Simon J. Watson, Rick S. Taylor, Sarah C. Avitabile, Natasha Schedvin, Kathryn Schneider, Michael F. Clarke
Year Published: 2019
Type: Document

A review of the applications of remote sensing in fire ecology

Wildfire plays an important role in ecosystem dynamics, land management, and global processes. Understanding the dynamics associated with wildfire, such as risks, spatial distribution, and effects is important for developing a clear understanding of its ecological influences. Remote sensing technologies provide a means to study fire...

Author(s): David M. Szpakowski, Jennifer L. Rooker Jensen
Year Published: 2019
Type: Document

Wildfire activity and land use drove 20th-century changes in forest cover in the Colorado front range
Recent shifts in global forest area highlight the importance of understanding the causes and consequences of forest change. To examine the influence of several potential drivers of forest cover change, we used supervised classifications of historical (1938-1940) and contemporary (2015) aerial imagery covering a 2932?km² study area...

Author(s): Kyle Rodman, Thomas T. Veblen, Sara Saraceni, Teresa B. Chapman
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

**Long-term evidence for fire as an ecohydrologic threshold-reversal mechanism on woodland?encroached sagebrush shrublands**
www.nrfirescience.org/resource/19828
Encroachment of sagebrush (Artemisia spp.) shrublands by pinyon (Pinus spp.) and juniper (Juniperus spp.) conifers (woodland encroachment) induces a shift from biotic?controlled resource retention to abiotic?driven loss of soil resources. This shift is driven by a coarsening of the vegetation structure with increasing dominance...

Author(s): C. Jason Williams, Frederick B. Pierson, Sayjro K. Nouwakpo, Patrick R. Kormos, Osama Z. Al-Hamdan, Mark A. Weltz
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

**Phenology patterns indicate recovery trajectories of ponderosa pine forests after high-severity fires**
www.nrfirescience.org/resource/21202
Post-fire recovery trajectories in ponderosa pine (Pinus ponderosa Laws.) forests of the southwestern United States are increasingly shifting away from pre-burn vegetation communities. This study investigated whether phenological metrics derived from a multi-decade remotely sensed imagery time-series could differentiate among grass...

Author(s): Jessica J. Walker, Christopher E. Soulard
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

**Peatland vegetation change and establishment of re-introduced Sphagnum moss after prescribed burning**
www.nrfirescience.org/resource/19377
Fire, including prescribed burning, is common on peatlands globally and can affect vegetation, including peat-forming Sphagnum mosses, and affect ecosystem services. We monitored vegetation in different burn-age categories at three UK peatland sites over a 19-month period. Half of the plots had Sphagnum fragments added and their...

Author(s): Alice Noble, Sheila M. Palmer, David J. Glaves, Alistair Crowle, Joseph Holden
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

**Wildfire alters the structure and seasonal dynamics of nocturnal pollen-transport networks**
www.nrfirescience.org/resource/20335
Wildfires drive global biodiversity patterns and affect plant–pollinator interactions, and are expected to become more frequent and severe under climate change. Post?fire plant communities often have increased floral abundance and diversity, but the effects of wildfires on the ecological process of
Post?fire forest regeneration shows limited climate tracking and potential for drought?induced type conversion
www.nrfirescience.org/resource/19037
Disturbance such as wildfire may create opportunities for plant communities to reorganize in response to climate change. The interaction between climate change and disturbance may be particularly important in forests, where many of the foundational plant species (trees) are long-lived and where poor initial tree establishment can...
Author(s): Derek J. N. Young, Chhaya M. Werner, Kevin R. Welch, Truman P. Young, Hugh Safford, Andrew Latimer
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

How Much Does Fire Behavior of Leaf Litter Beds Change within Two Months?
www.nrfirescience.org/resource/19754
Fire behavior is well-recognized as a function of fuel characteristics, but in practice the dynamics of fuels are often overlooked. Here we focus on short term changes in the fuel bed structure and fire behavior. Fire behavior and structural characteristics of leaf litter beds of Pinus halepensis, Ceratonia siliqua, and Quercus...
Author(s): Zorica Kauf, Walter Damsohn, Andreas Fangmeier
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Burning increases post-fire carbon emissions in a heathland and a raised bog, but experimental manipulation of fire severity has no effect
www.nrfirescience.org/resource/19357
Large amounts of carbon are stored in northern peatlands. There is concern that greater wildfire severity following projected increases in summer drought will lead to higher post-fire carbon losses. We measured soil carbon dynamics in a Calluna heathland and a raised peat bog after experimentally manipulating fire severity. A...
Author(s): Roger Grau-Andrés, Alan Gray, G. Matt Davies, E. Marian Scott, Susan Waldron
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Long-term impact of severe wildfire and post-wildfire salvage logging on macroinvertebrate assemblage structure in Alberta’s Rocky Mountains
www.nrfirescience.org/resource/20301
Wildfire is an important natural disturbance on forested landscapes influencing both physical and biological processes. The Lost Creek wildfire was one of the most severe on Alberta’s eastern slopes and provided a unique opportunity to assess the long-term impacts of wildfire and post-wildfire salvage logging on northern Rocky...
Ponderosa pine regeneration, wildland fuels management, and habitat conservation: identifying trade-offs following wildfire

www.nrfirescience.org/resource/19304

Increasing wildfires in western North American conifer forests have led to debates surrounding the application of post-fire management practices. There is a lack of consensus on whether (and to what extent) post-fire management assists or hinders managers in achieving goals, particularly in understudied regions like eastern...

Author(s): Victoria M. Donovan, Caleb P. Roberts, Carissa L. Wonkka, David A. Wedin, Dirac Twidwell
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Fire regimes of ponderosa pine (Pinus ponderosa) ecosystems in Colorado: a systematic review and meta-analysis

www.nrfirescience.org/resource/19636

Forest management, especially restoration, is informed by understanding the dominant natural disturbance regime. In many western North American forests the keystone disturbance is fire, and much research exists characterizing various fire regime parameters, although often only one or two parameters are addressed in individual...

Author(s): Shawn T. McKinney
Year Published: 2019
Type: Document
Synthesis

Vegetation succession in an old-growth ponderosa pine forest following structural restoration with fire: implications for retreatment and maintenance - JFSP Final Report

www.nrfirescience.org/resource/19272

Stand changes brought on by fire exclusion have contributed to reduced resilience to wildfire in ponderosa pine forests throughout the western US. Growing recognition of how structural attributes influence resilience has led to interest in restoring more heterogeneous conditions once common in these forests, but key information...

Author(s): Eric E. Knapp, Alan H. Taylor, Michelle Coppoletta, Natalie Pawlikowski
Year Published: 2019
Type: Document
Technical Report or White Paper

Fire effects on tree physiology

www.nrfirescience.org/resource/20160

Heat injuries sustained in a fire can initiate a cascade of complex mechanisms that affect the physiology of trees after fires. Uncovering the exact physiological mechanisms and relating specific injuries to whole?plant and ecosystem functioning is the focus of intense current research. Recent studies have made critical steps...

Author(s): Andreas Bär, Sean T. Michaletz, Stefan Mayr
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
Tree regeneration following wildfires in the western US: a review
www.nrfirescience.org/resource/19570
Background: Wildfires, like many disturbances, can be catalysts for ecosystem change. Given projected
climate change, tree regeneration declines and ecosystem shifts following severe wildfires are
predicted. We reviewed scientific literature on post-fire tree regeneration to understand where and why
no or few trees established. We...
Author(s): Camille Stevens-Rumann, Penelope Morgan
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Guidelines for aspen restoration in Utah with applicability to the Intermountain West
www.nrfirescience.org/resource/19550
As highly productive and biologically diverse communities, healthy quaking aspen (Populus
tremuloides; hereafter aspen) forests provide a wide range of ecosystem services across western North
America. Western aspen decline during the last century has been attributed to several causes and their
interactions, including altered fire...
Author(s): Stanley G. Kitchen, Patrick N. Behrens, Sherel Goodrich, Ashley Green, John Guyon, Mary
H. O'Brien, David Tart
Year Published: 2019
Type: Document
Technical Report or White Paper

Special Issue "Ecology and Restoration of Whitebark Pine"
www.nrfirescience.org/resource/20059
Whitebark pine (Pinus albicaulis) forests have been declining throughout their range in Western North
America from the combined effects of mountain pine beetle (Dendroctonus ponderosae) outbreaks, fire
exclusion policies, and the exotic disease white pine blister rust. Projected warming and drying trends in
climate may exacerbate...
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Distinguishing disturbance from perturbations in fire-prone ecosystems
www.nrfirescience.org/resource/19441
Fire is a necessary ecosystem process in many biomes and is best viewed as a natural disturbance
that is beneficial to ecosystem functioning. However, increasingly, we are seeing human interference in
fire regimes that alters the historical range of variability for most fire parameters and results in
vegetation shifts. Such...
Author(s): Jon E. Keeley, Juli G. Pausas
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Fire as a key driver of Earth's biodiversity
www.nrfirescience.org/resource/20577
Many terrestrial ecosystems are fire prone, such that their composition and structure are largely due to
their fire regime. Regions subject to regular fire have exceptionally high levels of species richness and
endemism, and fire has been proposed as a major driver of their diversity, within the context of climate,
Postwildfire seeding to restore native vegetation and limit exotic annuals: an evaluation in juniper-dominated sagebrush steppe
www.nrfirescience.org/resource/19222
Reestablishment of perennial vegetation is often needed after wildfires to limit exotic species and restore ecosystem services. However, there is growing body of evidence that questions if seeding after wildfires increases perennial vegetation and reduces exotic plants. The concern that seeding may not meet restoration goals is even...
Author(s): Kirk W. Davies, Jonathan D. Bates, Chad S. Boyd
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Cross-boundary cooperation for landscape management: collective action and social exchange among individual private forest landowners
www.nrfirescience.org/resource/20011
The landscape is an ideal spatial extent for managing forests because many ecological processes and disturbances occur on such scales. Moreover, landscape-level decision-making processes can improve the efficiency of forest management, as when many owners of small parcels increase the economy of scale of their operations by jointly...
Author(s): A. Paige Fischer, Andrew Klooster, Lora Cirhigiri
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Bunchgrass root abundances and their relationship to resistance and resilience of a burned shrub-steppe landscape
www.nrfirescience.org/resource/21235
Invasion of exotic annual grasses (EAG) and increased wildfire have led to an emphasis on managing rangeland plant communities for resistance to invasion and resilience to disturbances. In sagebrush steppe and similar rangelands, perennial bunchgrasses and particularly their roots are hypothesized to be primary contributors to...
Author(s): Matthew J. Germino, Matthew R. Fisk, Cara Applestein
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Comparison and integration of lidar and photogrammetric point clouds for mapping pre-fire forest structure
www.nrfirescience.org/resource/19424
Lidar is an established tool for mapping forest structure, but its sparse spatial and temporal coverage often preclude its use in studying forest disturbance. In contrast, aerial imagery has been and continues to be regularly collected in many regions, and advances in stereo image matching have automated the creation of dense...
Author(s): Steven K. Filippelli, Michael A. Lefsky, Monique E. Rocca
Year Published: 2019
Post-fire carbon dynamics in subalpine forests of the Rocky Mountains
www.nrfirescience.org/resource/20552
Forests store a large amount of terrestrial carbon, but this storage capacity is vulnerable to wildfire. Combustion, and subsequent tree mortality and soil erosion, can lead to increased carbon release and decreased carbon uptake. Previous work has shown that non-constant fire return intervals over the past 4000 years strongly...
Author(s): Kristina J. Bartowitz, Philip E. Higuera, Bryan N. Shuman, Kendra K. McLauchlan, Tara W. Hudiburg
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Generalized fire response strategies in plants and animals
www.nrfirescience.org/resource/19088
Despite the existing large body of research on plant?animal interactions, plant research and animal research are still relatively independent and asymmetrical in relation to disturbance. Animals and plants are likely to have different fire responses, yet biodiversity studies in relation to disturbance may benefit from a more...
Author(s): Juli G. Pausas
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

The survival of Pinus ponderosa saplings subjected to increasing levels of fire behavior and impacts on post?fire growth
www.nrfirescience.org/resource/19852
Improved predictions of tree species mortality and growth metrics following fires are important to assess fire impacts on forest succession, and ultimately forest growth and yield. Recent studies have shown that North American conifers exhibit a ‘toxicological dose-response’ relationship between fire behavior and the resultant...
Author(s): Wade D. Steady, Raquel Partelli Feltrin, Daniel M. Johnson, Aaron M. Sparks, Crystal A. Kolden, Alan F. Talhelm, James A. Lutz, Luigi Boschetti, Andrew T. Hudak, Andrew S. Nelson, Alistair M. S. Smith
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A physiological understanding of organismal responses to fire
www.nrfirescience.org/resource/19390
Devastation of both natural and human habitats due to wildfires is becoming an increasingly prevalent global issue. Fire-adapted and fire-prone regions, such as California and parts of Australia, are experiencing more frequent and increasingly destructive wildfires, accompanied by longer wildfire seasons. Further, wildfires are...
Author(s): Clare Stawski, Anna C. Doty
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
Wildfire refugia in forests: severe fire weather and drought mute the influence of topography and fuel age
www.nrfirescience.org/resource/20433
Wildfire refugia (unburnt patches within large wildfires) are important for the persistence of fire-sensitive species across forested landscapes globally. A key challenge is to identify the factors that determine the distribution of fire refugia across space and time. In particular, determining the relative influence of climatic...
Author(s): Luke Collins, Andrew F. Bennett, Steven W.J. Leonard, Trent D. Penman
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Wildfire activity and land use drove 20th?century changes in forest cover in the Colorado front range
www.nrfirescience.org/resource/19049
Recent shifts in global forest area highlight the importance of understanding the causes and consequences of forest change. To examine the influence of several potential drivers of forest cover change, we used supervised classifications of historical (1938-1940) and contemporary (2015) aerial imagery covering a 2932?km2 study area...
Author(s): Kyle Rodman, Thomas T. Veblen, Sara Saraceni, Teresa B. Chapman
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Wildfires as an ecosystem service
www.nrfirescience.org/resource/19798
...
Author(s): Juli G. Pausas, Jon E. Keeley
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Historical patterns of fire severity and forest structure and composition in a landscape structured by frequent large fires: Pumice Plateau ecoregion, Oregon, USA
www.nrfirescience.org/resource/19358
Context: Lack of quantitative observations of extent, frequency, and severity of large historical fires constrains awareness of departure of contemporary conditions from those that demonstrated resistance and resilience to frequent fire and recurring drought. Objectives: Compare historical and contemporary fire and forest...
Author(s): R. Keala Hagmann, Andrew G. Merschel, Matthew J. Reilly
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Hydraulic redistribution and hydrological controls on aspen transpiration and establishment in peatlands following wildfire
www.nrfirescience.org/resource/20324
In the sub?humid Western Boreal Plains of Alberta, where evapotranspiration often exceeds precipitation, trembling aspen (Populus tremuloides Michx.) uplands often depend on adjacent peatlands for water supply through hydraulic redistribution. Wildfire is common in the Boreal Plains, so
Corrigendum: Tree mortality from fires, bark beetles, and timber harvest during a hot and dry decade in the western United States (2003–2012)

www.nrfirescience.org/resource/19662

We discovered an error in our analysis that led us to underestimate tree mortality from fires and beetles in western California and northern Washington. We characterized fire extent and severity using the Monitoring Trends in Burn Severity raster mosaic data set. This data set did not maintain a consistent spatial extent across...

Author(s): Logan T. Berner, Beverly E. Law, Arjan J. H. Meddens, Jeffrey A. Hicke
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Combining optimization and simulation modelling to measure the cumulative impacts of prescribed fire and wildfire on vegetation species diversity

www.nrfirescience.org/resource/19332

Growth?stage optimization (GSO) offers a new approach to biodiversity conservation in fire?prone regions by estimating the optimal distribution of vegetation growth stages that maximize a species diversity index. This optimal growth?stage structure provides managers an operational goal explicitly linked to a positive...

Author(s): Matthew P. Chick, Alan York, Holly Sitters, Julian Di Stefano, Craig R. Nitschke
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

A system dynamics model examining alternative wildfire response policies

www.nrfirescience.org/resource/20284

In this paper, we develop a systems dynamics model of a coupled human and natural fire-prone system to evaluate changes in wildfire response policy. A primary motivation is exploring the implications of expanding the pace and scale of using wildfires as a forest restoration tool. We implement a model of a forested system composed of...

Author(s): Matthew P. Thompson, Yu Wei, Christopher J. Dunn, Christopher D. O'Connor
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Do Mixed Fire Regimes Shape Plant Flammability and Post-Fire Recovery Strategies?

www.nrfirescience.org/resource/18301

The development of frameworks for better-understanding ecological syndromes and putative evolutionary strategies of plant adaptation to fire has recently received a flurry of attention, including a new model hypothesizing that plants have diverged into three different plant flammability strategies due to natural selection. We...

Author(s): Helen M. Poulos, Andrew M. Barton, Jasper A. Slingsby, David M. J. S. Bowman
Year Published: 2018
Type: Document
Effects of climate change on ecological disturbance in the Northern Rockies (Chapter 7)
www.nrfirescience.org/resource/17279
Disturbances alter ecosystem, community, or population structures and change elements of the biological and/or physical environment. Climate changes can alter the timing, magnitude, frequency, and duration of disturbance events, as well as the interactions of disturbances on a landscape, and climate change may already be affecting...
Author(s): Rachel A. Loehman, Barbara J. Bentz, Gregg DeNitto, Robert E. Keane, Mary Manning, Jacob P. Duncan, Joel M. Egan, Marcus B. Jackson, Sandra Kegley, I. Blakley Lockman, Dean E. Pearson, James A. Powell, Steve Shelly, Brytten E. Steed, Paul J. Zambino
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

www.nrfirescience.org/resource/17720
Globally, wildfire size and frequency has increased in the last thirty years across numerous ecosystems. Models predict that trend to continue with increases in temperature and shifts in seasonal precipitation caused by climate change. In the western United States, these trends are exacerbated by invasive annual grasses that create...
Author(s): Eva K. Strand, Beth A. Newingham, Chris Bowman-Prideaux
Year Published: 2018
Type: Document
Technical Report or White Paper

Spectrophotometry of Artemisia tridentata to quantitatively determine subspecies
www.nrfirescience.org/resource/16752
Ecological restoration is predicated on our abilities to discern plant taxa. Taxonomic identification is a first step in ensuring that plants are appropriately adapted to the site. An example of the need to identify taxonomic differences comes from big sagebrush (Artemisia tridentata). This species is composed of three predominant...
Author(s): Bryce A. Richardson, Alicia A. Boyd, Tanner Tobiasson, Matthew J. Germino
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Common ground on the role of wildfire in forested landscapes of the Western US
www.nrfirescience.org/resource/18204
Wildfire affects the health and well-being of people, yet the science behind its management grapples with uncertainties that have led to scientific debates. In particular, diverging views over how "natural" highseverity fire is in conifer forests across the western US have, in some cases, impeded the effective integration of...
Year Published: 2018
Type: Document
Research Brief or Fact Sheet

Wyoming’s forest resources, 2011-2015
www.nrfirescience.org/resource/18841
This report summarizes the most recent inventory of Wyoming's forests based on field data collected between 2011 and 2015. The report includes descriptive highlights and tables of area, numbers of trees, biomass, carbon, volume, growth, mortality, and removals. Most sections and tables are organized by forest type or forest-type...  
Author(s): R. Justin DeRose, John D. Shaw, Sara A. Goeking, Kate Marcille, Chelsea P. McIver, James Menlove, Todd A. Morgan, Chris Witt  
Year Published: 2018  
Type: Document  
Research Brief or Fact Sheet

Wildfires managed for restoration enhance ecological resilience  
www.nrfirescience.org/resource/17222  
Expanding the footprint of natural fire has been proposed as one potential solution to increase the pace of forest restoration programs in fire-adapted landscapes of the western USA. However, studies that examine the long-term socio-ecological trade-offs of expanding natural fire to reduce wildfire risk and create fire...  
Author(s): Ana M. G. Barros, Alan A. Ager, Michelle A. Day, Meg A. Krawchuk, Thomas A. Spies  
Year Published: 2018  
Type: Document  
Book or Chapter or Journal Article

Composition and Structure of Forest Fire Refugia: What Are the Ecosystem Legacies across Burned Landscapes?  
www.nrfirescience.org/resource/17619  
Locations within forest fires that remain unburned or burn at low severity—known as fire refugia—are important components of contemporary burn mosaics, but their composition and structure at regional scales are poorly understood. Focusing on recent, large wildfires across the US Pacific Northwest (Oregon and Washington), our...  
Author(s): Garrett W. Meigs, Meg A. Krawchuk  
Year Published: 2018  
Type: Document  
Book or Chapter or Journal Article

Annual climate impacts on tree growth and post-fire regeneration in ponderosa pine and Douglas-fir in the northern Rocky Mountains  
www.nrfirescience.org/resource/18153  
This thesis includes two studies focused on quantifying the impacts of climate change, climate variability, and wildfires on forest dynamics. In Chapter 1, I compared the accuracy of field-based methods to precise dendrochronological techniques to age ponderosa pine and Douglas-fir seedlings sampled from three study regions across...  
Author(s): Lacey Hankin  
Year Published: 2018  
Type: Document  
Dissertation or Thesis

Ten Years of Monitoring Illustrates a Cascade of Effects of White Pine Blister Rust and Focuses Whitebark Pine Restoration in the Canadian Rocky and Columbia Mountains  
www.nrfirescience.org/resource/17189  
Whitebark pine forests are declining due to infection by white pine blister rust and mountain pine beetle, combined with the effects of climate change and fire suppression. The Canadian Rocky and Columbia Mountains represent a large portion of the whitebark range; a vast area, exemplifying the need for
knowledge about whitebark pine...
Author(s): Brenda Shepherd, Brad Jones, Robert Sissons, Jed Cochrane, Jane Park, Cyndi M. Smith, Natalie Stafl
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Change of clonal frequency in the second root sucker generation of hybrid aspen
www.nrfirescience.org/resource/16718
Two hybrid aspen (Populus tremula L.×P. tremuloides Michx.) trials in southern Sweden were used for studies of clonal composition in the second of two root sucker regenerations. Trial 1 was established in 1998 and originally included eight clones randomly distributed in four plots, each having 10×10 positions. Trial 2 was planted...
Author(s): Lars-Göran Stener, Dainis Rungis, Viktorija Belevich, Johan Malm
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Multitemporal LiDAR improves estimates of fire severity in forested landscapes
www.nrfirescience.org/resource/18124
Landsat-based fire severity maps have limited ecological resolution, which can hinder assessments of change to specific resources. Therefore, we evaluated the use of pre- and post-fire LiDAR, and combined LiDAR with Landsat-based relative differenced Normalized Burn Ratio (RdNBR) estimates, to increase the accuracy and resolution of...
Author(s): Michael S. Hoe, Christopher J. Dunn, Hailemariam Temesgen
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Drought, tree mortality, and wildfire in forests adapted to frequent fire
www.nrfirescience.org/resource/17144
Massive tree mortality has occurred rapidly in frequent-fire-adapted forests of the Sierra Nevada, California. This mortality is a product of acute drought compounded by the long-established removal of a key ecosystem process: frequent, low- to moderate-intensity fire. The recent tree mortality has many implications for the future...
Author(s): Scott L. Stephens, Brandon M. Collins, Christopher J. Fettig, Mark A. Finney, Chad M. Hoffman, Eric E. Knapp, Malcolm P. North, Hugh Safford, Rebecca Bewley Wayman
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

www.nrfirescience.org/resource/21258
The sagebrush (Artemisia spp.) ecosystem extends across a large portion of the Western United States, and the greater sage-grouse (Centrocercus urophasianus) is one of the iconic species of this ecosystem. Greater sage-grouse populations occur in 11 States and are dependent on relatively large expanses of sagebrush-dominated habitat...
Author(s): Steven E. Hanser
Year Published: 2018
Type: Document
Bridging the Divide: Integrating Animal and Plant Paradigms to Secure the Future of Biodiversity in Fire-Prone Ecosystems

Conserving animals and plants in fire-prone landscapes requires evidence of how fires affect modified ecosystems. Despite progress on this front, fire ecology is restricted by a dissonance between two dominant paradigms: ‘fire mosaics’ and ‘functional types’. The fire mosaic paradigm focuses on animal responses to fire...

Author(s): Luke T. Kelly, Lluis Brotons, Katherine M. Giljohann, Michael A. McCarthy, Juli G. Pausas, Annabel L. Smith
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Balancing ecological costs and benefits of fire for population viability of disturbance-dependent butterflies

Disturbance is a fundamental ecological process and driver of population dynamics. Ecologists seek to understand the effects of disturbance on ecological systems and to use disturbance to modify habitats degraded by anthropogenic change. Demographic responses by plants to disturbance are often well described, but demographic...

Author(s): Norah Warchola, Elizabeth E. Crone, Cheryl B. Schultz
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Year in Review: Spotlight on 2017 Research by the Grassland, Shrubland and Desert Ecosystems Science Program

In this issue of the GSD Update, we feature selected studies of the RMRS Grassland, Shrubland and Desert Ecosystems Science Program (GSD) that focus on the theme of fire. Significant results of recent research and science delivery by GSD scientists are highlighted. We feature program research that lines up with the strategic...

Year Published: 2018
Type: Document
Research Brief or Fact Sheet

Vertical distribution of foliar biomass in western larch (Larix occidentalis)

Western larch (Larix occidentalis Nutt.) is an endemic pioneer species in northwestern North America and unique as a deciduous conifer and the most shade-intolerant, fastest growing, and most fire-resistant species in the northwestern United States. To better understand its production ecology, we used a multilevel modeling approach...

Author(s): Geoffrey M. Williams, Andrew S. Nelson, David L.R. Affleck
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Unearthing belowground bud banks in fire-prone ecosystems
Despite long-time awareness of the importance of the location of buds in plant biology, research on belowground bud banks has been scant. Terms such as lignotuber, xylopodium and sobole, all referring to belowground bud-bearing structures, are used inconsistently in the literature. Because soil efficiently insulates meristems from...

Author(s): Juli G. Pausas, Byron B. Lamont, Susana Paula, Beatriz Appezzato-da-Glória, Alessandra Fidelis
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

**Detection of Annual Spruce Budworm Defoliation and Severity Classification Using Landsat Imagery**

Spruce budworm (SBW) is the most destructive forest pest in eastern forests of North America. Mapping annual current-year SBW defoliation is challenging because of the large landscape scale of infestations, high temporal/spatial variability, and the short period of time when detection is possible. We used Landsat-5 and Landsat-MSS...

Author(s): Parinaz Rahimzadeh-Bajgiran, Aaron R. Weiskittel, Daniel Kneeshaw, David A. MacLean
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

**Are germination cues for soil-stored seed banks different in structurally different fire-prone communities?**

Many plant species are dependent on soil-stored seeds for their persistence in fire-prone systems. Seed germination is often stimulated by fire-related cues including heat and smoke, but the way these cues promote germination may differ between structurally distinct plant communities with historically different fire regimes. In this...

Author(s): Gloria Neo Maikano, Janet S. Cohn, Julian Di Stefano
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

**Modelling the management of forest ecosystems: Importance of wood decomposition**

Scarcely uncertain data on woody debris decomposition rates are available for calibrating forest ecosystem models, owing to the difficulty of their empirical estimations. Using field data from three experimental sites which are part of the North American Long-Term Soil Productivity (LTSP) Study in south-eastern British Columbia (...)

Author(s): Juan A. Blanco, Deborah S. Page-Dumroese, Martin F. Jurgensen, Michael P. Curran, Joanne M. Tirocke, Joanna Walitalo
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

**Fine-scale spatial climate variation and drought mediate the likelihood of reburning**

In many forested ecosystems, it is increasingly recognized that the probability of burning is substantially reduced within the footprint of previously burned areas. This self-limiting effect of wildland fire is
considered a fundamental emergent property of ecosystems and is partly responsible for structuring landscape heterogeneity...

Author(s): Sean A. Parks, Marc-Andre Parisien, Carol Miller, Lisa M. Holsinger, Scott L. Baggett
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

It takes a few to tango: changing climate and fire regimes can cause regeneration failure of two subalpine conifers
www.nrfirescience.org/resource/18334
Environmental change is accelerating in the 21st century, but how multiple drivers may interact to alter forest resilience remains uncertain. In forests affected by large high-severity disturbances, tree regeneration is a resilience linchpin that shapes successional trajectories for decades. We modeled stands of two widespread...
Author(s): Winslow D. Hansen, Kristin H. Braziunas, Werner Rammer, Rupert Seidl, Monica G. Turner
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Forest management for novelty, persistence, and restoration influenced by policy and society
www.nrfirescience.org/resource/21056
The ecological literature offers many conflicting recommendations for how managers should respond to ecosystem change and novelty. We propose a framework in which forest managers may achieve desired forest characteristics by combining strategies for (1) restoring historical conditions, (2) maintaining current conditions, and (3)...
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Survey design for precise fire management conservation targets
www.nrfirescience.org/resource/17305
Common goals of ecological fire management are to sustain biodiversity and minimize extinction risk. A novel approach to achieving these goals determines the relative proportions of vegetation growth stages (equivalent to successional stages, which are categorical representations of time since fire) that maximize a biodiversity...
Author(s): Holly Sitters, Julian Di Stefano, Timothy J. Wills, Matthew Swan, Alan York
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

From the stand?scale to the landscape?scale: predicting the spatial patterns of forest regeneration after disturbance
www.nrfirescience.org/resource/17733
Shifting disturbance regimes can have cascading effects on many ecosystems processes. This is particularly true when the scale of the disturbance no longer matches the regeneration strategy of the dominant vegetation. In the yellow pine and mixed conifer forests of California, over a century of fire exclusion and the warming climate...
Author(s): Kristen L. Shive, Haiganoush K. Preisler, Kevin R. Welch, Hugh Safford, Ramona J. Butz,
Vegetation succession in post-fire seeding treatments - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/18258
Seed mixes used for post-fire seeding in the Great Basin are often selected based on short-term rehabilitation objectives, such as ability to rapidly establish and suppress invasive exotic annuals that drive altered fire-regimes via fine build-up (e.g. cheatgrass, Bromus tectorum L.), but longer-term considerations are also...
Author(s): Francis F. Kilkenny, Jeffrey E. Ott, Daniel D. Summers, Tyler W. Thompson
Year Published: 2018
Type: Document
Technical Report or White Paper

Natural Areas Association Fire Compendium 2
www.nrfirescience.org/resource/18853
The Natural Areas Association Fire Compendium 2 compiles articles published in the Natural Areas Journal from 2010 to 2017. This is a supplement to the NAA Fire Compendium that was compiled in 2010 for articles published from 1983 to 2009. Like the first compendium, articles in the Fire Compendium 2 focus on fire ecology and...
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Climate Change and Rocky Mountain Ecosystems
www.nrfirescience.org/resource/17274
Climate Change and Rocky Mountain Ecosystems describes the results of a cutting-edge effort to assess climate change vulnerabilities and develop adaptation options for ecosystems in the Northern Rocky Mountains region of the United States, focusing on national forests, grasslands, and parks in Northern Idaho, Montana, North Dakota,...
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Dormant-Season Fire Inhibits Sixweeks Fescue and Enhances Forage Production in Shortgrass Steppe
www.nrfirescience.org/resource/17672
Semiarid rangelands experience substantial interannual variability in precipitation, which can determine the relative abundance of species in any given year and influence the way that fire affects plant community composition and productivity. Long-term studies are needed to examine potential interactions between fluctuating...
Author(s): N. A. Dufek, David J. Augustine, Dana M. Blumenthal, Julie A. Kray, Justin D. Derner
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Common ground on the role of wildfire in forested landscapes of the western United States
For millennia, wildfires have markedly influenced forests and non-forested landscapes of the western United States (US), and they are increasingly seen as having substantial impacts on society and nature. There is growing concern over what kinds and amounts of fire will achieve desirable outcomes and limit harmful effects on people...

Author(s): Max A. Moritz, Christopher Topik, Craig D. Allen, Paul F. Hessburg, Penelope Morgan, Dennis C. Odion, Thomas T. Veblen, Ian M. McCullough

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

Prescribed fire regimes subtly alter ponderosa pine forest plant community structure

Prescribed fire is an active management tool used to address wildfire hazard and ecological concerns associated with fire exclusion and suppression over the past century. Despite widespread application in the United States, there is considerable inconsistency and lack of information regarding the extent to which specific outcomes...

Author(s): Becky K. Kerns, Michelle A. Day

Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Fire regimes approaching historic norms reduce wildfire-facilitated conversion from forest to non-forest

Extensive high-severity wildfires have driven major losses of ponderosa pine and mixed-conifer forests in the southwestern United States, in some settings catalyzing enduring conversions to non-forested vegetation types. Management interventions to reduce the probability of stand-replacing wildfire have included mechanical...

Author(s): Ryan B. Walker, Jonathan D. Coop, Sean A. Parks, Laura Trader

Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Assessing High-Cost Wildfires in Relation to the Natural Distribution of Ponderosa Pine in the 11 Western States (2000-2017)

This coarse-resolution assessment suggests that much of the West’s wildfire problem traces to the deteriorated condition of its dry ponderosa pine sites.

Author(s): Jerry T. Williams, Matthew Panunto

Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Simulation of net ecosystem productivity of a lodgepole pine forest after mountain pine beetle attack using a modified version of 3-PG

The most recent mountain pine beetle (MPB) (Dendroctonus ponderosae) outbreak in British Columbia (BC), which began in the late 1990s, killed 54% of the mature merchantable lodgepole pine and was expected to impact gross primary productivity (GPP), ecosystem respiration (R) and thus net ecosystem productivity (NEP) of infested...
Looking beyond the mean: Drivers of variability in postfire stand development of conifers in Greater Yellowstone
www.nrfirescience.org/resource/18421
High-severity, infrequent fires in forests shape landscape mosaics of stand age and structure for decades to centuries, and forest structure can vary substantially even among same-aged stands. This variability among stand structures can affect landscape-scale carbon and nitrogen cycling, wildlife habitat availability, and...

Pre?fire drought and competition mediate post?fire conifer mortality in western U.S. National Parks
www.nrfirescience.org/resource/21260
Tree mortality is an important outcome of many forest fires. Extensive tree injuries from fire may lead directly to mortality, but environmental and biological stressors may also contribute to tree death. However, there is little evidence showing how the combined effects of two common stressors, drought and competition, influence...

Environmental, Structural, and Disturbance Influences over Forest Floor Components in Interior Douglas-Fir Forests of the Intermountain West, USA
www.nrfirescience.org/resource/18077
Downed woody material (DWM) is a key component in forest ecosystems with age, structure, and disturbance described as primary factors that influence DWM dynamics. In particular, much emphasis is placed on large coarse woody debris (CWD). Fine woody debris (FWD) (less than 7.62 cm diameter), duff, and litter also contribute to carbon...

Biological and geophysical feedbacks with fire in the Earth system
www.nrfirescience.org/resource/17407
Roughly 3% of the Earth's land surface burns annually, representing a critical exchange of energy and matter between the land and atmosphere via combustion. Fires range from slow smouldering peat fires, to low-intensity surface fires, to intense crown fires, depending on vegetation structure, fuel moisture, prevailing climate, and...
Plant community responses to historical wildfire in a shrubland–grassland ecotone reveal hybrid disturbance response
www.nrfirescience.org/resource/18067
Most ecotones include structural and taxonomic elements from both adjacent communities, but it remains unclear how these elements function and interact within ecotones. We investigated long-term plant community responses to wildfire in a 7000-km² ecotone between mixed-grass prairie and sagebrush steppe ecosystems, which have...
Author(s): Lauren M. Porensky, Justin D. Derner, David W. Pellatz
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Wildfire-vegetation dynamics affect predictions of climate change impact on bird communities
www.nrfirescience.org/resource/17360
Community-level climate change indicators have been proposed to appraise the impact of global warming on community composition. However, non-climate factors may also critically influence species distribution and biological community assembly. The aim of this paper was to study how fire-vegetation dynamics can modify our ability to...
Author(s): Adrián Regos, Miguel Clavero, Manuela D'Amen, Antoine Guisan, Lluis Brotons
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Does repeated high severity fire in dry mixed conifer forests homogenize vegetation characteristics across scales? - JFSP Final Report
www.nrfirescience.org/resource/18039
When disturbances recur at rates shorter than an ecosystems rate of recovery, it has the potential to result in significant changes to ecosystem structure and function. In western US forests, wildfire activity has increased and many severely burned areas are now re-burning before reforestation occurs. Historically, some of these...
Author(s): Kristen L. Shive, Scott L. Stephens
Year Published: 2018
Type: Document
Technical Report or White Paper

Fire-induced change in floral abundance, density, and phenology benefits bumble bee foragers
www.nrfirescience.org/resource/17345
Fire is a dominant, and well-studied, structuring force in many temperate and semi-arid communities; yet, few studies have investigated the effects of fire on multi-trophic interactions. Here, we ask how fire-induced changes in flowering affect the abundance of bumble bee foragers (Bombus vosnesenskii) and whether differences in...
Author(s): John M. Mola, Neal M. Williams
Year Published: 2018
Anticipating fire-mediated impacts of climate change using a demographic framework
www.nrfirescience.org/resource/17910
Climate change indirectly affects forest ecosystems through changes in the frequency, size, and/or severity of wildfires. In addition to its direct effects prior to fire, climate also influences immediate postfire recruitment, with consequences for future vegetation structure and fire activity. A major uncertainty, therefore, is if...
Author(s): Kimberley T. Davis, Philip E. Higuera, Anna Sala
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Historic frequency and severity of fire in whitebark pine forests of the Cascade Mountain Range, USA
www.nrfirescience.org/resource/16810
Whitebark pine (Pinus albicaulis Engelm.) is a foundation species of high elevation forest ecosystems in the Cascade Mountain Range of Oregon, Washington, and British Columbia. We examined fire evidence on 55 fire history sites located in the Cascade Range. To estimate dates of historic fires we analyzed 57 partial cross-sections...
Author(s): Michael P. Murray, Joel Siderius
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Best friends forever: The whitebark pine and Clark’s nutcracker
www.nrfirescience.org/resource/18338
The Clark’s nutcracker has a mutualistic relationship with the whitebark pine, acting as the tree’s main seed dispersal mechanism.
Author(s): Robert E. Keane, Samuel A. Cushman
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

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

Snowshoe hare multi-level habitat use in a fire-adapted ecosystem
www.nrfirescience.org/resource/17333
Prescribed burning has the potential to improve habitat for species that depend on pyric ecosystems or
other early successional vegetation types. For species that occupy diverse plant communities over the extent of their range, response to disturbances such as fire might vary based on post-disturbance vegetation dynamics among plant...

Author(s): Laura C. Gigliotti, Benjamin C. Jones, Matthew J. Lovallo, Duane R. Diefenbach
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Fire-induced deforestation in drought-prone Mediterranean forests: drivers and unknowns from leaves to communities

www.nrfirescience.org/resource/17750
Over the past 15 years, 3 million hectares of forests have been converted into shrublands or grasslands in the Mediterranean countries of the European Union. Fire and drought are the main drivers underlying this deforestation. Here we present a conceptual framework for the process of fire-induced deforestation based on the...

Author(s): Asaf Karavani, Matthias M. Boer, Mara Baudena, Carlos Colinas, Rubén Díaz-Sierra, Jesús Pemán, Martín de Luis, Álvaro Enríquez-Salamanca, Víctor Resco de Dios
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Removal of perennial herbaceous species affects response of cold desert scrublands to fire

www.nrfirescience.org/resource/16529
Two of the primary global change factors that threaten shrublands worldwide are loss of native perennial herbaceous species due to inappropriate livestock grazing and loss of native shrubs due to altered fire regimes. We asked: (1) how do the separate and interacting effects of removal of perennial herbaceous species and burning...

Author(s): Jeanne C. Chambers, David Board, Bruce A. Roundy, Peter J. Weisberg
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Slow awakening: ecology's role in shaping forest fire policy

www.nrfirescience.org/resource/19236
Soon after its inception in the early 1900s the U.S. Forest Service adopted a policy that can be described as “fire exclusion,” based on the view that forest fires were unnecessary and a menace.1 In the late 1970s, however, the agency was compelled by facts on the ground to begin transitioning to managing fire as an inherent...

Author(s): Stephen F. Arno
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Learn from the burn: The High Park Fire 5 years later

www.nrfirescience.org/resource/16520
It has been 5 years since the High Park Fire burned over 85,000 acres in Northern Colorado, causing extensive property damage, loss of life, and severe impacts to the water quality of the Poudre River. In the fall of 2016, a conference was organized by the USFS Rocky Mountain Research Station and the Coalition for the Poudre River...

Author(s): Charles C. Rhoades, Peter R. Robichaud, Sandra E. Ryan, Jen Kovecses, Carl Chambers, Sara Rathburn, Jared Heath, Stephanie Kampf, Codie Wilson, Dan Brogan, Brad Piehl, Mary Ellen
The Influence of Western Spruce Budworm on Fire in Spruce-Fir Forests

www.nrfirescience.org/resource/16730

Western spruce budworm (Choristoneura freemani Razowski; WSBW) is the most significant defoliator of coniferous trees in the western United States. Despite its important influence on Western forests, there are still gaps in our knowledge of WSBW’s impact on fire, and little research has been done on this relationship in high-...

Author(s): Eric Vane, Kristen M. Waring, Adam Polinko
Year Published: 2017
Type: Document

Guide to Quaking Aspen Ecology and Management

www.nrfirescience.org/resource/16371

In this field guide, I use a “systems approach” to aspen ecology and management. We have learned much, though perhaps not adequately communicated, about varying aspen types around our region (Rogers et al. 2014). For example, what new information is available about fire behavior in aspen, and how might we best apply that...

Author(s): Paul C. Rogers
Year Published: 2017
Type: Document

Ecological effects of fire

www.nrfirescience.org/resource/16500

Fire is an enormously influential disturbance over large areas of land in the modern world. Vegetation burns because the Earth’s atmosphere contains sufficient oxygen (415%) to support combustion (Pyne, 2001). Oxygen started to accumulate in the atmosphere about 2 billion years ago and, since the appearance of plants in the...

Author(s): William J. Bond, Robert E. Keane
Year Published: 2017
Type: Document

Climate variability and fire effects on quaking aspen in the central Rocky Mountains, USA

www.nrfirescience.org/resource/14978

Our understanding of how climate and fire have impacted quaking aspen (Populus tremuloides Michx.) communities prior to the 20th century is fairly limited. This study analysed the period between 4500 and 2000 cal. yr BP to assess the pre-historic role of climate and fire on an aspen community during an aspen-dominated period.

Author(s): Vachel A. Carter, Andrea R. Brunelle, John D. Shaw, Thomas A. Minckley, R. Justin DeRose, Simon C. Brewer
Year Published: 2017
Type: Document

Book or Chapter or Journal Article
Prescribed fire in grassland butterfly habitat: targeting weather and fuel conditions to reduce soil temperature and burn severity
www.nrfirescience.org/resource/16319
Prescribed burning is a primary tool for habitat restoration and management in fire-adapted grasslands. Concerns about detrimental effects of burning on butterfly populations, however, can inhibit implementation of treatments. Burning in cool and humid conditions is likely to result in lowered soil temperatures and to produce...
Author(s): Kathryn C. Hill, Jonathan D. Bakker, Peter W. Dunwiddie
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Post-fire vegetation response at the woodland-shrubland interface is mediated by the pre-fire community
www.nrfirescience.org/resource/16496
Understanding the drivers of ecosystem responses to disturbance is essential for management aimed at maintaining or restoring ecosystem processes and services, especially where invasive species respond strongly to disturbance. In this study, we used repeat vegetation surveys from a network of prescribed fire treatments at the...
Author(s): Alexandra K. Urza, Peter J. Weisberg, Jeanne C. Chambers, Jessica M. Dhaemers, David Board
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Populus tremuloides seedling establishment: An underexplored vector for forest type conversion after multiple disturbances
www.nrfirescience.org/resource/16697
Ecosystem resilience to climate change is contingent on post-disturbance plant regeneration. Sparse gymnosperm regeneration has been documented in subalpine forests following recent wildfires and compounded disturbances, both of which are increasing. In the US Intermountain West, this may cause a shift to non-forest in some areas,...
Author(s): Nathan S. Gill, Florencia Sangermano, Brian Buma, Dominik Kulakowski
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Post-fire forest regeneration in a changing climate - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/17003
Severe disturbance such as wildfire may create important opportunities for plant communities to reorganize in response to environmental change, including climate change. Disturbance may be particularly important in forests where the foundational plant species (trees) are long-lived and usually establish soon after disturbance. The...
Author(s): Derek J. N. Young, Andrew Latimer
Year Published: 2017
Type: Document
Technical Report or White Paper

A multicentury dendrochronological reconstruction of western spruce budworm outbreaks in the Okanogan Highlands, northeastern Washington
results of recent research and science delivery by GSD scientists are highlighted. We feature program research that lines up with the...
Author(s): Deborah M. Finch
Year Published: 2017
Type: Document
Management or Planning Document

Reburns and fire-on-fire interactions in the U.S. northern Rockies forests 1900-2014
www.nrfirescience.org/resource/15307
The interactions of fire on the landscape between 1900 and 2014 are explored in this master's thesis. A description of its content is not yet available from University of Idaho.
Author(s): Justin Barton Lauer
Year Published: 2017
Type: Document
Dissertation or Thesis

Tree mortality from fires, bark beetles, and timber harvest during a hot and dry decade in the western United States (2003–2012)
www.nrfirescience.org/resource/19661
High temperatures and severe drought contributed to extensive tree mortality from fires and bark beetles during the 2000s in parts of the western continental United States. Several states in this region have greenhouse gas (GHG) emission targets and would benefit from information on the amount of carbon stored in tree biomass killed...
Author(s): Logan T. Berner, Beverly E. Law, Arjan J. H. Meddens, Jeffrey A. Hicke
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

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

Interactions of landscape disturbances and climate change dictate ecological pattern and process: spatial modeling of wildfire, insect, and disease dynamics under future climates
www.nrfirescience.org/resource/15531
Context: Interactions among disturbances, climate, and vegetation influence landscape patterns and ecosystem processes. Climate changes, exotic invasions, beetle outbreaks, altered fire regimes, and human activities may interact to produce landscapes that appear and function beyond historical analogs. Objectives We used the...
Author(s): Rachel A. Loehman, Robert E. Keane, Lisa M. Holsinger, Zhiwei Wu
Year Published: 2017
Type: Document
Book or Chapter or Journal Article
Tamm Review: Shifting global fire regimes: Lessons from reburns and research needs
www.nrfirescience.org/resource/20223
Across the globe, rising temperatures and altered precipitation patterns have caused persistent regional
droughts, lengthened fire seasons, and increased the number of weather-driven extreme fire events.
Because wildfires currently impact an increasing proportion of the total area burned, land managers
need to better understand...
Author(s): Susan J. Prichard, Camille Stevens-Rumann, Paul F. Hessburg
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Spatial patterns of ponderosa pine regeneration in high-severity burn patches
www.nrfirescience.org/resource/16541
Contemporary wildfires in southwestern US ponderosa pine forests can leave uncharacteristically large
patches of tree mortality, raising concerns about the lack of seed-producing trees, which can prevent or
significantly delay ponderosa pine regeneration. We established 4-ha plots in high-severity burn
patches in two Arizona...
Author(s): Suzanne M. Owen, Carolyn Hull Sieg, Andrew Sanchez Meador, Peter Z. Fule, Jose M.
Inigurez, Scott L. Baggett, Paula J. Fornwalt, Michael A. Battaglia
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Landscape-scale quantification of fire-induced change in canopy cover following mountain pine
beetle outbreak and timber harvest
www.nrfirescience.org/resource/15137
Across the western United States, the three primary drivers of tree mortality and carbon balance are
bark beetles, timber harvest, and wildfire. While these agents of forest change frequently overlap,
uncertainty remains regarding their interactions and influence on specific subsequent fire effects such
as change in canopy cover....
Author(s): T. Ryan McCarley, Crystal A. Kolden, Nicole M. Vaillant, Andrew T. Hudak, Alistair M. S.
Smith, Jason Kreitler
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Climate adaption and post-fire restoration of a foundational perennial in cold desert: Insights
from intraspecific variation in response to weather
www.nrfirescience.org/resource/16523
1) The loss of foundational but fire-intolerant perennials such as sagebrush due to increases in fire size
and frequency in semi-arid regions has motivated efforts to restore them, often with mixed or even no
success. Seeds of sagebrush Artemisia tridentata and related species must be moved considerable
distances from seed source to...
Author(s): Martha M. Brabec, Matthew J. Germino, Bryce A. Richardson
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Predicting Post-Fire Tree Mortality for 12 Western US Conifers Using the First Order Fire Effects
Model (FOFEM)
www.nrfirescience.org/resource/16738
Accurate prediction of fire-caused tree mortality is critical for making sound land management decisions such as developing burning prescriptions and post-fire management guidelines. To improve efforts to predict post-fire tree mortality, we developed 3-year post-fire mortality models for 12 Western conifer species-white fir (Abies...  
Author(s): Sharon M. Hood, Duncan C. Lutes  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

Fire Severity and Regeneration Strategy Influence Shrub Patch Size and Structure Following Disturbance  
www.nrfirescience.org/resource/17204  
Climate change is increasing the frequency and extent of high-severity disturbance, with potential to alter vegetation community composition and structure in environments sensitive to tipping points between alternative states. Shrub species display a range of characteristics that promote resistance and resilience to disturbance, and...  
Author(s): Jesse Minor, Donald A. Falk, Greg A. Barron-Gafford  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

Evidence of compounded disturbance effects on vegetation recovery following high-severity wildfire and spruce beetle outbreak  
www.nrfirescience.org/resource/16510  
Spruce beetle (Dendroctonus rufipennis) outbreaks are rapidly spreading throughout subalpine forests of the Rocky Mountains, raising concerns that altered fuel structures may increase the ecological severity of wildfires. Although many recent studies have found no conclusive link between beetle outbreaks and increased fire size or...  
Author(s): Amanda R. Carlson, Jason S. Sibold, Timothy J. Assal, Jose F. Negron  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

Fires following Bark Beetles: Factors Controlling Severity and Disturbance Interactions in Ponderosa Pine  
www.nrfirescience.org/resource/16727  
Previous studies have suggested that bark beetles and fires can be interacting disturbances, whereby bark beetle–caused tree mortality can alter the risk and severity of subsequent wildland fires. However, there remains considerable uncertainty around the type and magnitude of the interaction between fires following bark beetle...  
Author(s): Carolyn Hull Sieg, Rodman Linn, F. Pimont, Chad M. Hoffman, Joel D. McMillin, Judith Winterkamp, Scott L. Baggett  
Year Published: 2017  
Type: Document  
Book or Chapter or Journal Article

Disturbance and productivity interactions mediate stability of forest composition and structure  
www.nrfirescience.org/resource/16499  
Fire is returning to many conifer-dominated forests where species composition and structure have been altered by fire exclusion. Ecological effects of these fires are influenced strongly by the degree of forest change during the fire-free period. Response of fire-adapted species assemblages to extended fire-free
Simulations Inform Design Of Regional Occupancy-Based Monitoring For A Sparsely Distributed, Territorial Species

www.nrfirescience.org/resource/17463

Sparsely distributed species attract conservation concern, but insufficient information on population trends challenges conservation and funding prioritization. Occupancy-based monitoring is attractive for these species, but appropriate sampling design and inference depend on particulars of the study system. We employed spatially...

A review and classification of interactions between forest disturbance from wind and fire

www.nrfirescience.org/resource/16702

Current research on interactions between ecological disturbances emphasizes the potential for greatly enhanced ecological effects that may occur when disturbances interact. Much less attention has focused on the possibility of disturbance interactions that buffer ecological change. In this review, we discuss and classify evidence...

Long-term impacts of wildfire on fuel loads, vegetation composition, and potential fire behavior and management in sagebrush-dominated ecosystems - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17010

An understanding of the long-term vegetation structure, patterns of fuel succession, and potential for reburn in sagebrush-dominated ecosystems is important for managing the landscape at a temporal scale that is appropriate for the ecological interactions in these systems. Our overarching research objective was to fill existing...

Site preparation severity influences lodgepole pine plant community composition, diversity, and succession over 25 years

www.nrfirescience.org/resource/16474

Lodgepole pine (Pinus contorta var. latifolia Engelm.) ecosystems of central British Columbia face cumulative stresses, and management practices are increasingly scrutinized. We addressed trade-offs between “light-on-the-land” versus more aggressive silvicultural approaches by examining plant communities and indicator species (...
Restoration of the iconic Pando aspen clone: emerging evidence of recovery
www.nrfirescience.org/resource/14933
Quaking aspen (Populus tremuloides Michx.) is being stressed across the America West from a variety of sources including drought, herbivory, fire suppression, development, and past management practices. Rich assemblages of plants and animals that utilize aspen forests, as well as economic values of tourism, grazing, hunting,...
Author(s): Paul C. Rogers, Jody A. Gale
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Characterizing interactions between fire and other disturbances and their impacts on tree mortality in western U.S. forests
www.nrfirescience.org/resource/16268
Increasing evidence that pervasive warming trends are altering disturbance regimes and their interactions with fire has generated substantial interest and debate over the implications of these changes. Previous work has primarily focused on conditions that promote non-additive interactions of linked and compounded disturbances, but...
Author(s): Jeffrey M. Kane, J. Morgan Varner, Margaret R. Metz, Phillip J. van Mantgem
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Forest succession along a productivity gradient following fire exclusion
www.nrfirescience.org/resource/16658
Numerous studies have documented significant change in conifer forests of the American West following the cessation of recurrent fire at the end of the 19th century. But the successional dynamics that characterize different forested settings in the absence of fire remain poorly understood. This study reconstructs structural and...
Author(s): James D. Johnston
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Climatic conditions for emergence and flight of mountain pine beetle: implications for long-distance dispersal
www.nrfirescience.org/resource/16454
A significant shift in the mountain pine beetle (Dendroctonus ponderosae Hopkins, 1902) range has been attributed to long-distance dispersal from the observed spatiotemporal patterns of beetle infestations in the recent outbreak in western Canada. However, long-distance dispersal is still the least understood aspect of mountain pine...
Author(s): Huapeng Chen, Peter L. Jackson
Year Published: 2017
Type: Document
Book or Chapter or Journal Article
Estimating aboveground tree biomass for beetle-killed lodgepole pine in the Rocky Mountains of northern Colorado

www.nrfirescience.org/resource/16593

The recent mountain pine beetle (Dendroctonus ponderosae Hopkins) epidemic has affected millions of hectares of conifer forests in the Rocky Mountains. Land managers are interested in using biomass from beetle-killed trees for bioenergy and biobased products, but they lack adequate information to accurately estimate biomass in...

Author(s): Woodam Chung, Paul Evangelista, Nathaniel Anderson, Anthony Vorster, Hee Han, Krishna Poudel, Robert Sturtevant

Year Published: 2017
Type: Document

Fire regimes of ponderosa pine communities in the Black Hills and surrounding areas

www.nrfirescience.org/resource/16433

Wildfire is an important disturbance in ponderosa pine communities in the Black Hills and surrounding areas. Effective management of these communities requires an understanding of historical fire regimes. This review provides a synthesis of the available scientific literature on historical patterns and contemporary changes in fuels...

Author(s): Shannon K. Murphy

Year Published: 2017
Type: Document

Fens and their rare plants in the Beartooth Mountains, Shoshone National Forest, Wyoming

www.nrfirescience.org/resource/15589

Fens are common wetlands in the Beartooth Mountains on the Shoshone National Forest, Clarks Fork Ranger District, in Park County, Wyoming. Fens harbor plant species found in no other habitats, and some rare plants occurring in Beartooth fens are found nowhere else in Wyoming. This report summarizes the studies on Beartooth fens from...

Author(s): Bonnie Heidel, Walter Fertig, Sabine Mellmann-Brown, Kent E. Houston, Kathleen A. Dwire

Year Published: 2017
Type: Document

Using resilience and resistance concepts to manage persistent threats to sagebrush ecosystems and greater sage-grouse

www.nrfirescience.org/resource/16558

Conservation of imperiled species often demands addressing a complex suite of threats that undermine species viability. Regulatory approaches, such as the US Endangered Species Act (1973), tend to focus on anthropogenic threats through adoption of policies and regulatory mechanisms. However, persistent ecosystem-based threats, such...

Author(s): Jeanne C. Chambers, Jeremy D. Maestas, David A. Pyke, Chad S. Boyd, Michael L. Pellant, Amarina Wuenschel

Year Published: 2017
Type: Document

Indicators of burn severity at extended temporal scales: A decade of ecosystem response in mixed conifer forests of western Montana

www.nrfirescience.org/resource/15315
We collected field and remotely sensed data spanning 10 years after three 2003 Montana wildfires to monitor ecological change across multiple temporal and spatial scales. Multiple endmember spectral mixture analysis was used to create post-fire maps of: char, soil, green (GV) and non-photosynthetic (NPV) vegetation from high-...

Author(s): Sarah A. Lewis, Andrew T. Hudak, Peter R. Robichaud, Penelope Morgan, K.L. Satterberg, Eva K. Strand, Alistair M. S. Smith, J Zamudio, Leigh B. Lentile
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Pretreatment tree dominance and conifer removal treatments affect plant succession in sagebrush communities

www.nrfirescience.org/resource/16547
In sagebrush (Artemisia tridentata Nutt.) ecosystems, expansion and infilling of conifers decreases the abundance of understory perennial vegetation and lowers ecosystem resilience and resistance of the once shrub grass ? dominated state. We prescribed burned or cut juniper (Juniperus spp. L.) and pinyon (Pinus spp. L.) trees at...

Author(s): Rachel E. Williams, Bruce A. Roundy, April Hulet, Richard F. Miller, Robin J. Tausch, Jeanne C. Chambers, Jeffrey Matthews, Robert Schooley, Dennis Eggett
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Changing disturbance regimes, climate warming and forest resilience

www.nrfirescience.org/resource/16807
Ecological memory is central to how ecosystems respond to disturbance and is maintained by two types of legacies – information and material. Species life-history traits represent an adaptive response to disturbance and are an information legacy; in contrast, the abiotic and biotic structures (such as seeds or nutrients) produced...

Author(s): Jill F. Johnstone, Craig D. Allen, Jerry F. Franklin, Lee E. Frelich, Brian J. Harvey, Philip E. Higuera, Michelle Mack, Ross K. Meentemeyer, Margaret R. Metz, George L.W. Perry, Tania L. Schoennagel, Monica G. Turner
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Wildland fire limits subsequent fire occurrence

www.nrfirescience.org/resource/15303
Several aspects of wildland fire are moderated by site- and landscape-level vegetation changes caused by previous fire, thereby creating a dynamic where one fire exerts a regulatory control on subsequent fire. For example, wildland fire has been shown to regulate the size and severity of subsequent fire. However, wildland fire has...

Author(s): Sean A. Parks, Carol Miller, Lisa M. Holsinger, Scott L. Baggett, Benjamin J. Bird
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Whitebark Pine Friendly Ski Area Certification Program launches this fall at Whitefish Mountain, Montana

www.nrfirescience.org/resource/14622
Where do most of the general public encounter whitebark pines? Ski areas! These recreational areas in
high elevations allow many to encounter an otherwise remote and wilderness species. This accessibility of whitebark pines at ski areas serves as the motivation behind the Whitebark Pine Ecosystem Foundation’s...

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

Elevational shifts in thermal suitability for mountain pine beetle population growth in a changing climate

www.nrfirescience.org/resource/14987

Future forests are being shaped by changing climate and disturbances. Climate change is causing large-scale forest declines globally, in addition to distributional shifts of many tree species. Because environmental cues dictate insect seasonality and population success, climate change is also influencing tree-killing bark beetles....

Author(s): Barbara J. Bentz, Jacob P. Duncan, James A. Powell
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Climate influences on whitebark pine mortality from mountain pine beetle in the Greater Yellowstone Ecosystem

www.nrfirescience.org/resource/14565

Extensive mortality of whitebark pine, beginning in the early to mid-2000s, occurred in the Greater Yellowstone Ecosystem (GYE) of the western US, primarily from mountain pine beetle but also from other threats such as white pine blister rust. The climatic drivers of this recent mortality and the potential for future whitebark pine...

Author(s): Polly C. Buotte, Jeffrey A. Hicke, Haiganoush K. Preisler, John T. Abatzoglou, Kenneth F. Raffa, Jesse A. Logan
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Centrocercus minimus, Centrocercus urophasianus (Gunnison sage-grouse, greater sage-grouse)

www.nrfirescience.org/resource/10784

This FEIS species review synthesizes information on the relationship of Centrocercus minimus, Centrocercus urophasianus (Gunnison sage-grouse, greater sage-grouse) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire management
Prescribed fire does not promote outbreaks of a primary bark beetle at low-density populations

www.nrfirescience.org/resource/13941

The causes of bark beetle outbreaks - particularly the role of disturbances - are poorly understood. Stand-scale disturbances, like fires, can suddenly improve local host susceptibility and may attract beetles; however, whether such increases can lead to outbreaks in post-disturbance stands is unclear.

Author(s): Crisia A. Tabacaru, Jane Park, Nadir Erbilgin
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Using resilience and resistance concepts to manage threats to sagebrush ecosystems, Gunnison sage-grouse, and Greater sage-grouse in their eastern range: a strategic multi-scale approach

www.nrfirescience.org/resource/14967

This report provides a strategic approach developed by a Western Association of Fish and Wildlife Agencies interagency working group for conservation of sagebrush ecosystems, Greater sage-grouse, and Gunnison sage-grouse. It uses information on (1) factors that influence sagebrush ecosystem resilience to disturbance and resistance...

Year Published: 2016
Type: Document
Technical Report or White Paper

Shifting ecological filters mediate postfire expansion of seedling aspen (Populus tremuloides) in Yellowstone

www.nrfirescience.org/resource/13896

Determining how ecological filters (e.g., climate, soils, biotic interactions) influence where species succeed in heterogeneous landscapes is challenging for long-lived species (e.g., trees), because filters can vary over space and change slowly through time. Stand-replacing wildfires create opportunities for establishment of tree-...

Author(s): Winslow D. Hansen, William H. Romme, Aisha Ba, Monica G. Turner
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Wilderness in the 21st Century: A framework for testing assumptions about ecological intervention in wilderness using a case study of fire ecology in the Rocky Mountains

www.nrfirescience.org/resource/14471

Changes in the climate and in key ecological processes are prompting increased debate about ecological restoration and other interventions in wilderness. The prospect of intervention in wilderness raises legal, scientific, and values-based questions about the appropriateness of possible actions. In
this article, we focus on the role...
Author(s): Cameron Naficy, Eric G. Keeling, Peter Landres, Paul F. Hessburg, Thomas T. Veblen, Anna Sala
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Relative importance of climate and mountain pine beetle outbreaks on the occurrence of large wildfires in the western USA
www.nrfirescience.org/resource/14899
Extensive outbreaks of bark beetles have killed trees across millions of hectares of forests and woodlands in western North America. These outbreaks have led to spirited scientific, public, and policy debates about consequential increases in fire risk, especially in the wildland–urban interface (WUI), where homes and communities...
Author(s): Dominik Kulakowski, Nathan Mietkiewicz
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

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

Recent tree mortality in the western United States from bark beetles and forest fires
www.nrfirescience.org/resource/14323
Forests are substantially influenced by disturbances, and therefore accurate information about the location, timing, and magnitude of disturbances is important for understanding effects. In the western United States, the two major disturbance agents that kill trees are wildfire and bark beetle outbreaks. Our objective was to...
Author(s): Jeffrey A. Hicke, Arjan J. H. Meddens, Crystal A. Kolden
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
Yellowstone fire history and fire ecology - Insights 27 years after the 1988 fires
www.nrfirescience.org/resource/14651
In 1988, fires burned 36% (about 800,000 acres) of Yellowstone National Park (YNP). At the time, the size and severity of these fires was greater than scientists and land managers were used to and they were attributed to excessive fuel loadings that were a result of past fire suppression. However, fire history and fire ecology...
Author(s): Corey L. Gucker
Year Published: 2016
Type: Document
Research Brief or Fact Sheet

Deterministic and stochastic processes lead to divergence in plant communities 25 years after the 1988 Yellowstone fires
www.nrfirescience.org/resource/14620
Young, recently burned forests are increasingly widespread throughout western North America, but forest development after large wildfires is not fully understood, especially regarding effects of variable burn severity, environmental heterogeneity, and changes in drivers over time. We followed development of subalpine forests after...
Author(s): William H. Romme, Timothy G. Whitby, Daniel B. Tinker, Monica G. Turner
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Forest health in a changing world: effects of globalization and climate change on forest insect and pathogen impacts
www.nrfirescience.org/resource/14992
Forests and trees throughout the world are increasingly affected by factors related to global change. Expanding international trade has facilitated invasions of numerous insects and pathogens into new regions. Many of these invasions have caused substantial forest damage, economic impacts and losses of ecosystem goods and services...
Author(s): T. D. Ramsfield, Barbara J. Bentz, M. Faccoli, H. Jactel, E. G. Brockerhoff
Year Published: 2016
Type: Document
Book or Chapter or Journal Article, Synthesis

Mountain pine beetles: A century of knowledge, control attempts, and impacts central to the Black Hills
www.nrfirescience.org/resource/14583
This publication chronicles the understanding, controlling, and impacts of mountain pine beetles (MPB) central to the Black Hills of South Dakota and Wyoming from the time they were described by Hopkins in 1902, through the presentation of data from work started by Schmid and Mata in 1985. The plots established by these two men from...
Author(s): Russell T. Graham, Michael A. Battaglia, Theresa B. Jain, Lance A. Asherin, Stephen A. Mata
Year Published: 2016
Type: Document
Synthesis, Technical Report or White Paper
A dynamical model for bark beetle outbreaks
www.nrfirescience.org/resource/14984
Tree-killing bark beetles are major disturbance agents affecting coniferous forest ecosystems. The role of environmental conditions on driving beetle outbreaks is becoming increasingly important as global climatic change alters environmental factors, such as drought stress, that, in turn, govern tree resistance. Furthermore,...
Author(s): Vlastimil Krivan, Mark Lewis, Barbara J. Bentz, Sharon Bewick, Suzanne M. Lenhart, Andrew Liebhold
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 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

Conservation and management of whitebark pine ecosystems
www.nrfirescience.org/resource/14563
This reference presents general guidelines for planning, implementing, and evaluating whitebark pine conservation and management activities on lands administered by the Bureau of Land Management.
Author(s): Dana L. Perkins, Robert E. Means, Alexia C. Cochrane
Year Published: 2016
Type: Document
Synthesis, Technical Report or White Paper

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

Cumulative disturbance on the landscape: lessons from the Pole Creek fire, Oregon
www.nrfirescience.org/resource/14519
Previous research has focused on quantifying fuel loadings and using operational fire behavior models to understand changes in fire severity following MPB outbreaks. In this study however, researchers used direct field measurements taken from the 2012 Pole Creek Fire that burned in lodgepole pine forests in central Oregon’s...

Author(s): Northwest Fire Science Consortium
Year Published: 2016
Type: Document
Research Brief or Fact Sheet

Achievable future conditions as a framework for guiding forest conservation and management
www.nrfirescience.org/resource/13788
We contend that traditional approaches to forest conservation and management will be inadequate given the predicted scale of social-economic and biophysical changes in the 21st century. New approaches, focused on anticipating and guiding ecological responses to change, are urgently needed to ensure the full value of forest ecosystem...

Author(s): Stephen W. Golladay, Katherine L. Martin, James M. Vose, David N. Wear, Alan P. Covitch, Richard J. Hobbs, Kier D. Klepzig, Gene E. Likens, Robert J. Naiman, Allan W. Shearer
Year Published: 2016
Type: Document
Book or Chapter or Journal Article, Synthesis

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

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

Trajectories and resilience of stand structure in response to variable disturbance severities in northern hardwoods
www.nrfirescience.org/resource/16836
In late successional forests, stand development processes are often more easily monitored and are more closely related to key ecological parameters when using structural criteria rather than stand age or time since stand-replacing disturbance. In this paper, the effects of various disturbance regimes on long-term structural change...
Community structure, biodiversity, and ecosystem services in treeline whitebark pine communities: Potential impacts from a non-native pathogen
www.nrfirescience.org/resource/14358
Whitebark pine (Pinus albicaulis) has the largest and most northerly distribution of any white pine (Subgenus Strobus) in North America, encompassing 18° latitude and 21° longitude in western mountains. Within this broad range, however, whitebark pine occurs within a narrow elevational zone, including upper subalpine and treeline...

Conserving whitebark pine in ski areas - Demonstrations at Whitefish Mountain Resort
www.nrfirescience.org/resource/14705
As part of the Whitebark Pine Ecosystem Foundation’s Annual Science and Management Workshop - Successes and Challenges in Managing the Jewel in the Crown of the Continent, participants saw first hand some of the challenges facing whitebark pine restoration, and they witnessed certification of the first Whitebark Pine Friendly Ski...

Do insect outbreaks reduce the severity of subsequent forest fires?
www.nrfirescience.org/resource/14260
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—....

A 20-year reassessment of the health and status of whitebark pine forests in the Bob Marshall Wilderness Complex, Montana
www.nrfirescience.org/resource/14676
Whitebark pine plays a prominent role in high elevation ecosystems of the northern Rocky Mountains. It is an important food source for many birds and mammals as well as an essential component of watershed stabilization. Whitebark pine is vanishing from the landscape due to three main factors: white pine blister rust, mountain pine...
The role of fire in aspen ecology and restoration
www.nrfirescience.org/resource/16377
Quaking aspen is generally considered to be a fire-adapted species because it regenerates prolifically after fire, and it can be replaced by more shade-tolerant tree species in the absence of fire. As early-successional aspen stands transition to greater conifer-dominance, they become increasingly fire prone, until fire returns, and...
Author(s): Douglas J. Shinneman, Kevin Krasnow, Susan K. McIlroy
Year Published: 2015
Type: Document
Research Brief or Fact Sheet

Short-interval disturbance in lodgepole pine forests, British Columbia, Canada: understory and overstory response to mountain pine beetle and fire
www.nrfirescience.org/resource/14159
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
Book or Chapter or Journal Article

Quantifying and predicting fuels and the effects of reduction treatments along successional and invasion gradients in sagebrush habitats - JFSP final report
www.nrfirescience.org/resource/15504
Sagebrush shrubland ecosystems in the Great Basin are prime examples of how altered successional trajectories can create dynamic fuel conditions and, thus, increase uncertainty about fire risk and behavior. Although fire is a natural disturbance in sagebrush, post-fire environments are highly susceptible to conversion to an invasive...
Author(s): Douglas J. Shinneman, David S. Pilliod, Robert S. Arkle, Nancy F. Glenn
Year Published: 2015
Type: Document
Technical Report or White Paper

Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks
www.nrfirescience.org/resource/14154
In the western United States, mountain pine beetles (MPBs) have killed pine trees across 71,000 km2 of forest since the mid-1990s, leading to widespread concern that abundant dead fuels may increase area burned and exacerbate fire behavior. Although stand-level fire behavior models suggest that bark beetle-induced tree mortality...
Author(s): Sarah Hart, Tania L. Schoennagel, Thomas T. Veblen, Teresa B. Chapman
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Postfire shrub cover dynamics: A 70-year fire chronosequence in mountain big sagebrush communities
Fire is natural in sagebrush (Artemisia L.) communities. In this study, we quantify effects of time since last burn (TSLB) on shrub cover over a 70-year (yr) fire chronosequence. We sampled mountain big sagebrush communities with very large-scale aerial (VLSA) imagery and measured sagebrush, antelope bitterbrush (Purshia tridentata...)

Author(s): Corey A. Moffet, J. Bret Taylor, D. Terrance Booth
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

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

Complex response of white pines to past environmental variability increases understanding of future vulnerability

Ecological niche models predict plant responses to climate change by circumscribing species distributions within a multivariate environmental framework. Most projections based on modern bioclimatic correlations imply that high-elevation species are likely to be extirpated from their current ranges as a result of rising growing-...

Author(s): Virginia Iglesias, Teresa R. Krause, Cathy L. Whitlock
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Fuel loads and simulated fire behavior in 'old-stage' beetle-infested ponderosa pine of the Colorado Plateau

Recent bark beetle outbreaks in western North America have led to concerns regarding changes in fuel profiles and associated changes in fire behavior. Data are lacking for a range of infestation severities and time since outbreak, especially for relatively arid cover types. We surveyed fuel loads and simulated fire behavior for...

Author(s): E. Matthew Hansen, Morris C. Johnson, Barbara J. Bentz, A. Steven Munson
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

The ecological importance of mixed-severity fire: nature’s phoenix

If you are a curious reader with a knack for the analytical, you may be asking yourself, Why start a book about fire ecology with a mythological figure? And if you are a tried-and-true scientist, like we are, you may also be asking, Isn’t it a bit risky to mix myth with science, fact with fiction, observation with
Temperate forest health in an era of emerging megadisturbance
www.nrfirescience.org/resource/13501
Although disturbances such as fire and native insects can contribute to natural dynamics of forest health, exceptional droughts, directly and in combination with other disturbance factors, are pushing some temperate forests beyond thresholds of sustainability. Interactions from increasing temperatures, drought, native insects and...
Author(s): Constance I. Millar, Nathan L. Stephenson
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Temperate forest health in an era of emerging megadisturbance
www.nrfirescience.org/resource/13722
Although disturbances such as fire and native insects can contribute to natural dynamics of forest health, exceptional droughts, directly and in combination with other disturbance factors, are pushing some temperate forests beyond thresholds of sustainability. Interactions from increasing temperatures, drought, native insects and...
Author(s): Constance I. Millar, Nathan L. Stephenson
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Low-severity fire increases tree defense against bark beetle attacks
www.nrfirescience.org/resource/14366
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
Book or Chapter or Journal Article

Climate Contributors to Forest Mosaics: Ecological Persistence
www.nrfirescience.org/resource/15625
It is hypothesized that climate impacts forest mosaics through dynamic ecological processes such as wildfires. However, climate-fire research has primarily focused on understanding drivers of fire frequency and area burned, largely due to scale mismatches and limited data availability. Recent datasets, however, allow for the...
Author(s): Crystal A. Kolden, John T. Abatzoglou, James A. Lutz, C. Alina Cansler, Jonathan T. Kane, Jan W. van Wagendonk, Carl H. Key
Year Published: 2015
Type: Document
Book or Chapter or Journal Article
Forest resilience and tipping points at different spatio-temporal scales: approaches and challenges
www.nrfirescience.org/resource/16830
1. Anthropogenic global change compromises forest resilience, with profound impacts to ecosystem functions and services. This synthesis paper reflects on the current understanding of forest resilience and potential tipping points under environmental change and explores challenges to assessing responses using experiments....
Author(s): Christopher P. O. Reyer, Niels Brouwers, Anja Rammig, Barry W. Brook, Jackie Epila, Robert F. Grant, Milena Holmgren, Fanny Langerwisch, Sebastian Leuzinger, Wolfgang Lucht, Belinda Medlyn, Marion Pfeifer, Jorg Steinkamp, Mark C. Vanderwel, Hans Verbeeck, Dora M. Villela
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Managing fire, understanding ourselves: human dimensions in safety and wildland fire
www.nrfirescience.org/resource/18394
Wildland fire management has risen to the forefront of land management and now receives greater social and political attention than ever before. As we progress through the 21st century, these areas of attention are continually presenting challenges never experienced before. We may consider ourselves well positioned to move into the...
Year Published: 2015
Type: Document
Conference Proceedings

Belowground impacts of pile burning in the Inland Northwestern U.S.
www.nrfirescience.org/resource/15565
Forest restoration efforts require thinning operations to reduce tree density, wildfire risk, or insect and disease conditions to improve ecosystem processes and function. However, one issue with the thinned stands is to dispose of the residues. Slash pile burning is currently used on many forest sites as a preferred method for...
Author(s): Deborah S. Page-Dumroese, Christopher R. Keyes, Martin F. Jurgensen, William J. Massman, Bret W. Butler
Year Published: 2015
Type: Document
Technical Report or White Paper

Tree mortality from drought, insects, and their interactions in a changing climate
www.nrfirescience.org/resource/13635
Climate change is expected to drive increased tree mortality through drought, heat stress, and insect attacks, with manifold impacts on forest ecosystems. Yet, climate-induced tree mortality and biotic disturbance agents are largely absent from process-based ecosystem models. Using data sets from the western USA and associated...
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Corrigendum to - Challenges of establishing big sagebrush (Artemisia tridentata) in rangeland
The loss of big sagebrush (Artemisia tridentata Nutt.) on sites disturbed by fire has motivated restoration seeding and planting efforts. However, the resulting sagebrush establishment is often lower than desired, especially in dry areas. Sagebrush establishment may be increased by addressing factors such as seed source and...

Author(s): Martha M. Brabec, Matthew J. Germino, Douglas J. Shinneman, David S. Pilliod, Susan K. McIlroy, Robert S. Arkle
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

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

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

Recent large and severe outbreaks of native bark beetles have raised concern among the general public and land managers about potential for amplified fire activity in western North America. To date, the majority of studies examining bark beetle outbreaks and subsequent fire severity in the U.S. Rocky Mountains have focused on...

Author(s): Robert A. Andrus, Thomas T. Veblen, Brian J. Harvey, Sarah Hart
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Increased wildfire activity and recent bark beetle outbreaks in the western United States have increased the potential for interactions between disturbance types to influence forest characteristics. However, the effects of interactions between bark beetle outbreaks and subsequent wildfires on forest succession remain poorly...

Author(s): Camille Stevens-Rumann, Penelope Morgan, Chad M. Hoffman
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

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

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

Does wildfire likelihood or severity increase following insect outbreaks in conifer forests?
www.nrfirescience.org/resource/14153
Although there is acute concern that insect-caused tree mortality increases the likelihood or severity of subsequent wildfire, previous studies have been mixed, with findings typically based on stand-scale simulations or individual events. This study investigates landscape- and regional-scale wildfire likelihood following outbreaks...

Author(s): Garrett W. Meigs, John L. Campbell, Harold S. Zald, John D. Bailey, David C. Shaw, Robert E. Kennedy
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Wildland Fuel Fundamentals and Applications
www.nrfirescience.org/resource/20889
Wildland fuels are a critical factor in fire management because they are the one factor that managers can control. However, fuels have always been defined, described, and quantified in the context of inputs to fire behavior models. Wildland fuel science was always considered part of fire behavior research and the two have been...

Author(s): Robert E. Keane
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Tree physiology and bark beetles
www.nrfirescience.org/resource/13305
Irruptive bark beetles usually co-occur with their co-evolved tree hosts at very low (endemic) population densities. However, recent droughts and higher temperatures have promoted widespread tree mortality with consequences for forest carbon, fire and ecosystem services (Kurz et al., 2008; Raffa et al., 2008; Jenkins et al., 2012)....

Author(s): Michael G. Ryan, Gerard Sapes, Anna Sala, Sharon M. Hood
Year Published: 2015
Type: Document
Book or Chapter or Journal Article, Synthesis

Modeling spatial and temporal dynamics of wind flow and potential fire behavior following a mountain pine beetle outbreak in a lodgepole pine forest
www.nrfirescience.org/resource/13298
Patches of live, dead, and dying trees resulting from bark beetle-caused mortality alter spatial and temporal variability in the canopy and surface fuel complex through changes in the foliar moisture content of attacked trees and through the redistribution of canopy fuels. The resulting heterogeneous fuels complexes alter within-...
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

Paths of recovery: landscape variability in forest structure, function, and fuels after the 1988 Yellowstone Fires

www.nrfirescience.org/resource/13720
Understanding the rates, trajectories, and spatial variability in succession following severe wildfire is increasingly important for forest managers in western North America and critical for anticipating the resilience or vulnerability of forested landscapes to changing environmental conditions. However, few long-term...

Author(s): Monica G. Turner, William H. Romme, Daniel B. Tinker, Daniel C. Donato, Brian J. Harvey
Year Published: 2015
Type: Document
Technical Report or White Paper

Proceedings of the large wildland fires conference

www.nrfirescience.org/resource/18395
Large fires or "megafires" have been a major topic in wildland fire research and management for over a decade. There is great debate regarding the impacts of large fires. Many believe that they (1) are occurring too frequently, (2) are burning abnormally large areas, (3) cause uncharacteristically adverse ecological harm, and (4)...

Year Published: 2015
Type: Document
Conference Proceedings

Interactions among climate, wildfire and tree regeneration at lower treeline in the U.S. northern rockies

www.nrfirescience.org/resource/15564
Recent increases in area burned in the western U.S. have raised concerns about the resilience of forests to large wildfires, particularly in dry mixed-conifer forests, where climate change and 20th-century land management have altered species composition, fuel loads, and fire regimes. To study forest resilience to recent wildfires,...

Author(s): Philip E. Higuera, Kerry Kemp
Year Published: 2015
Type: Document
Technical Report or White Paper
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

Recent mountain pine beetle outbreaks, wildfire severity, and postfire tree regeneration in the US northern Rockies
www.nrfirescience.org/resource/13007
Widespread tree mortality caused by outbreaks of native bark beetles (Circulionidae: Scolytinae) in recent decades has raised concern among scientists and forest managers about whether beetle outbreaks fuel more ecologically severe forest fires and impair postfire resilience. To investigate this question, we collected extensive...
Author(s): Brian J. Harvey, Daniel C. Donato, Monica G. Turner
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Climate change and United States forests
www.nrfirescience.org/resource/12393
This volume offers a scientific assessment of the effects of climatic variability and change on forest resources in the United States. Derived from a report that provides technical input to the 2013 U.S. Global Change Research Program National Climate Assessment, the book serves as a framework for managing U.S. forest resources in...
Author(s): David L. Peterson, James M. Vose, Toral Patel-Weynand
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Building resilience into quaking aspen management
www.nrfirescience.org/resource/16373
Throughout the 20th century, forest scientists and land managers were guided by principles of succession with regard to aspen forests. The historical model depicted aspen as a "pioneer species" that colonizes a site following disturbance and is eventually overtopped by conifers. Aspen systems are more diverse, however, than...
Author(s): Paul C. Rogers
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

Fire severity and tree regeneration following bark beetle outbreaks: the role of outbreak stage and burning conditions
www.nrfirescience.org/resource/13328
The degree to which recent bark beetle (Dendroctonus ponderosae) outbreaks may influence fire
severity and postfire tree regeneration is of heightened interest to resource managers throughout western North America, but empirical data on actual fire effects are lacking. Outcomes may depend on burning conditions (i.e., weather during...  

Author(s): Brian J. Harvey, Daniel C. Donato, William H. Romme, Monica G. Turner  
Year Published: 2014  
Type: Document  
Book or Chapter or Journal Article

Northern Rockies pyrogeography: an example of fire atlas utility  
www.nrfirescience.org/resource/12923  
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

Contrasting effects of wildfire and ecological restoration in old-growth western larch forests  
www.nrfirescience.org/resource/13003  
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 had more, taller, and...  

Author(s): Taylor Hopkins, Andrew J. Larson, R. Travis Belote  
Year Published: 2014  
Type: Document  
Book or Chapter or Journal Article

Ecological Consequences Of Mountain Pine Beetle Outbreaks For Wildlife In Western North American Forests  
www.nrfirescience.org/resource/17469  
Mountain pine beetle (Dendroctonus ponderosae) (MPB) outbreaks are increasingly prevalent in western North America, causing considerable ecological change in pine (Pinus spp.) forests with important implications for wildlife. We reviewed studies examining wildlife responses to MPB outbreaks and postoutbreak salvage logging to inform...  

Author(s): Victoria A. Saab, Quresh Latif, Mary M. Rowland, Tracey N. Johnson, Anna D. Chalfoun, Steven W. Buskirk, Joslin E. Heyward, Matthew A. Dresser  
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  
www.nrfirescience.org/resource/12994  
The Yellowstone to Yukon Conservation Initiative (Y2Y) was established over 20 years ago as an experiment in large landscape conservation. Initially, Y2Y emerged as a response to large scale habitat fragmentation by advancing ecological connectivity. It also laid the foundation for large scale multi-stakeholder conservation...  

Author(s): Gary M. Tabor, Anne Carlson, R. Travis Belote
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

Bromus tectorum response to fire varies with climate conditions

www.nrfirescience.org/resource/12979

The invasive annual grass Bromus tectorum (cheatgrass) forms a positive feedback with fire in some areas of western North America's sagebrush biome by increasing fire frequency and size, which then increases B. tectorum abundance post-fire and dramatically alters ecosystem structure and processes. However, this positive response to...

Author(s): Kimberly Taylor, Tyler Brummer, Lisa J. Rew, Matt Lavin, Bruce D. Maxwell

Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Don't blame the beetles

www.nrfirescience.org/resource/13290

Tiny insects called bark beetles have devastated forests in western North America over the past decade. Life has drained from millions of hectares of forest so quickly that it seemed as if they had been abruptly unplugged, like a Christmas tree before bedtime. And many people have feared the infestation's fallout, worrying that the...

Author(s): Cally Carswell

Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Cattle grazing and vegetation succession on burned sagebrush steppe

www.nrfirescience.org/resource/12968

There is limited information about the effects of cattle grazing to longer-term plant community composition and herbage production following fire in sagebrush steppe. This study evaluated vegetation response to cattle grazing over 7 yr (2007-2013) on burned Wyoming big sagebrush (Artemisia tridentata ssp. wyomingensis [Beetle &...)

Author(s): Jonathan D. Bates, Kirk W. Davies

Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Disturbance legacies increase the resilience of forest ecosystem structure, composition, and
Disturbances are key drivers of forest ecosystem dynamics, and forests are well adapted to their natural disturbance regimes. However, as a result of climate change, disturbance frequency is expected to increase in the future in many regions. It is not yet clear how such changes might affect forest ecosystems, and which mechanisms...

Author(s): Rupert Seidl, Werner Rammer, Thomas A. Spies
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Citizens, government officials, and natural resource managers are greatly concerned about potential impacts of the mountain pine beetle (MPB) epidemic on fire hazards and risk. Some mountain towns are surrounded by dead and dying trees. In the Rocky Mountain Region of the Forest Service, the MPB epidemic threatens over 250,000 acres...

Author(s): Russell A. Parsons, William Matt Jolly, Paul G. Langowski, Megan Matonis, I. Sue Miller
Year Published: 2014
Type: Document
Conference Proceedings

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
Book or Chapter or Journal Article

Post-fire mulch and seeding treatments, often applied on steep, severely burned slopes immediately after large wildfires, are meant to reduce the potential of erosion and establishment of invasive plants, especially non-native plants, that could threaten values at risk. However, the effects of these treatments on native vegetation...

Author(s): Penelope Morgan, Marshell Moy, Christine A. Droske, Leigh B. Lentile, Sarah A. Lewis, Peter R. Robichaud, Andrew T. Hudak
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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...
Fire activity and severity in the western US vary along proxy gradients representing fuel amount and fuel moisture

www.nrfirescience.org/resource/13016

Numerous theoretical and empirical studies have shown that wildfire activity (e.g., area burned) at regional to global scales may be limited at the extremes of environmental gradients such as productivity or moisture. Fire activity, however, represents only one component of the fire regime, and no studies to date have characterized...

Author(s): Sean A. Parks, Marc-Andre Parisien, Carol Miller, Solomon Z. Dobrowski
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
Type: Document
Book or Chapter or Journal Article, Synthesis

Dry forest resilience varies under simulated climate-management scenarios in a central Oregon, USA landscape

www.nrfirescience.org/resource/14233

Determining appropriate actions to create or maintain landscapes resilient to climate change is challenging because of uncertainty associated with potential effects of climate change and their interactions with land management. We used a set of climate-informed state-and-transition models to explore the effects of management and...

Author(s): Joshua S. Halofsky, Jessica E. Halofsky, Theresa Burcsu, Miles A. Hemstrom
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Quantifying restoration effectiveness using multi-scale habitat models: implications for sage-grouse in the Great Basin

www.nrfirescience.org/resource/12947

A recurrent challenge in the conservation of wide-ranging, imperiled species is understanding which habitats to protect and whether we are capable of restoring degraded landscapes. For Greater Sage-grouse (Centrocercus urophasianus), a species of conservation concern in the western United States, we approached this problem by...

Author(s): Robert S. Arkle, David S. Pilliod, Steven E. Hanser, Matthew L. Brooks, Jeanne C. Chambers, James B. Grace, Kevin C. Knutson, David A. Pyke, Justin L. Welty, Troy A. Wirth
Climate and very large wildland fires in the contiguous western USA
www.nrfirescience.org/resource/13009
Very large wildfires can cause significant economic and environmental damage, including destruction of homes, adverse air quality, firefighting costs and even loss of life. We examine how climate is associated with very large wildland fires (VLWFs > or = 50,000 acres, or ~20,234 ha) in the western contiguous USA. We used composite...
Author(s): E. Natasha Stavros, John T. Abatzoglou, Narasimhan K. Larkin, Donald McKenzie, E. Ashley Steel
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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

Management for mountain pine beetle outbreak suppression: does relevant science support current policy?
www.nrfirescience.org/resource/13571
While the use of timber harvests is generally accepted as an effective approach to controlling bark beetles during outbreaks, in reality there has been a dearth of monitoring to assess outcomes, and failures are often not reported. Additionally, few studies have focused on how these treatments affect forest structure and function...
Author(s): Diana L. Six, Eric Biber, Elisabeth Long
Year Published: 2014
Type: Document
Book or Chapter or Journal Article, Synthesis

Regional projections of the likelihood of very large wildland fires under a changing climate in the contiguous western United States
www.nrfirescience.org/resource/13006
Seasonal changes in the climatic potential for very large wildfires (VLWF > or = 50,000 ac ~20,234 ha) across the western contiguous United States are projected over the 21st century using generalized linear models and downscaled climate projections for two representative concentration pathways (RCPs). Significant (p < or =0....
Author(s): E. Natasha Stavros, John T. Abatzoglou, Donald McKenzie, Narasimhan K. Larkin
Year Published: 2014
Type: Document
Book or Chapter or Journal Article
Why firefighters should embrace fire ecology
www.nrfirescience.org/resource/19235
My first experience fighting a wildfire came in 1962; the same year naturalist Rachael Carson published Silent Spring, the book that jolted me and other Americans into awareness of ecological relationships and how important they are to life on earth. The following summer, as a trainee ranger in Sequoia-Kings Canyon national parks...
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

Patterns and mechanisms of plant succession after fire on Artemisia-grass sites in southeastern Idaho
www.nrfirescience.org/resource/15400
Cover data for plant species on eight environmentally similar sites that were each burned in a different year (from 2 to 36 years ago) were used to construct a composite sequence of vegetational change after fire on Artemisia-grassland sites in southeastern Idaho. Some species were early successional such as Lithospermum ruderale,...
Author(s): David L. Humphrey
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: a strategic multi-scale approach
www.nrfirescience.org/resource/12989
This Report provides a strategic approach for conservation of sagebrush ecosystems and Greater Sage- Grouse (sage-grouse) that focuses specifically on habitat threats caused by invasive annual grasses and altered fire regimes. It uses information on factors that influence (1) sagebrush ecosystem resilience to disturbance and...
Author(s): Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Michael L. Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, Aamarina Wuenschel
Year Published: 2014
Type: Document
Management or Planning Document

Large wildfire trends in the western United States, 1984-2011
We used a database capturing large wildfires (> 405 ha) in the western U.S. to document regional trends in fire occurrence, total fire area, fire size, and day of year of ignition for 1984-2011. Over the western U.S. and in a majority of ecoregions, we found significant, increasing trends in the number of large fires and/or total...

Author(s): Philip E. Dennison, Simon C. Brewer, James D. Arnold, Max A. Moritz
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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

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

Preliminary resource vulnerability assessment

This document is an assessment of the FS Northern Region's key water resources, tree species, wildlife species, and disturbances, which includes descriptions of the species' current condition, existing stressors, sensitivity to and expected effects of climate changes, and adaptive capacity.

Author(s): Northern Region Adaptation Partnership
Year Published: 2014
Type: Document
Technical Report or White Paper

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

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

Future Forests Webinar Series, webinar proceedings and summary: ongoing research and management responses to the mountain pine beetle outbreak

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...

Year Published: 2014
A new metric for quantifying burn severity: the relativized burn ratio
www.nrfirescience.org/resource/13053
Satellite-inferred burn severity data have become increasingly popular over the last decade for management and research purposes. These data typically quantify spectral change between pre-and post-fire satellite images (usually Landsat). There is an active debate regarding which of the two main equations, the delta normalized burn...
Author(s): Sean A. Parks, Gregory K. Dillon, Carol Miller
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Landsat time series and lidar as predictors of live and dead basal area across five bark beetle-affected forests
www.nrfirescience.org/resource/13623
Bark beetle-caused tree mortality affects important forest ecosystem processes. Remote sensing methodologies that quantify live and dead basal area (BA) in bark beetle-affected forests can provide valuable information to forest managers and researchers. We compared the utility of light detection and ranging (lidar) and the Landsat...
Author(s): Benjamin C. Bright, Andrew T. Hudak, Robert E. Kennedy, Arjan J. H. Meddens
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

The impacts of changing disturbance regimes on serotinous plant populations and communities
www.nrfirescience.org/resource/12406
Climatic change is anticipated to alter disturbance regimes for many ecosystems. Among the most important effects are changes in the frequency, size, and intensity of wildfires. Serotiny (long-term canopy storage and the heat-induced release of seeds) is a fire-resilience mechanism found in many globally important terrestrial...
Author(s): Brian Buma, Carissa D. Brown, Daniel C. Donato, Joseph B. Fontaine, Jill F. Johnstone
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Whitebark pine restoration challenges - Restoration site visits in the Bridger Mountains
www.nrfirescience.org/resource/12929
As part of the 13th Whitebark Pine Ecosystem Science and Management Workshop - Challenges of Whitebark Pine Restoration, participants visited a whitebark pine restoration area near Fairy Lake in the Bridger Mountains north of Bozeman, MT (Figure 1). The restoration site at about 8,000 feet supports both whitebark pine (Pinus...

Corydalis sempervirens (pink corydalis)
www.nrfirescience.org/resource/10933
This FEIS species review synthesizes information on the relationship of Corydalis sempervirens (pink 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...
Author(s): Rachelle Meyer
Year Published: 2013
Type: Document
Synthesis

Eriophorum viridicarinatum (green-keeled cottongrass)
www.nrfirescience.org/resource/11521
This FEIS species review synthesizes information on the relationship of Eriophorum viridicarinatum (green-keeled cottongrass) 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): Robin J. Innes
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

Trial by fire
www.nrfirescience.org/resource/12135
1) Conservation partners across 11 western states are rallying in unprecedented fashion to reduce threats to sage-grouse and the sagebrush ecosystem they occupy. 2) Improvements made in the Bureau of Land Management's (BLM) wildfire policy are a tremendous step forward but the 2012 wildfire season is a harsh reminder that more...
Author(s): Tim Murphy, David E. Naugle, Randall Eardley, Jeremy D. Maestas, Tim Griffiths, Michael L. Pellant, San J. Stiver
**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

**Surface fire intensity influences simulated crown fire behavior in lodgepole pine forests with recent mountain pine beetle-caused tree mortality**

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

**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

**Progress in understanding bark beetle effects on fire behavior using physics-based models**

Bark beetle outbreaks are a major disturbance of forests throughout western North America affecting ecological processes and social and economic values (Amman 1977, Bond and Keeley 2005). Since the 1990s, bark beetle outbreaks have affected between 1.1 and 13.5 million acres in the western United States and an additional 13.5...

Author(s): Chad M. Hoffman, Carolyn Hull Sieg, Penelope Morgan, William E. Mell, Rodman Linn, Camille Stevens-Rumann, Joel D. McMillin, Russell A. Parsons, Helen Maffei
Year Published: 2013
Type: Document
Book or Chapter or Journal Article
**Accipiter gentilis (northern goshawk)**

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**

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**Does Kochia prostrata spread from seeded sites? an evaluation from southwestern Idaho, USA**

Purposeful introductions of exotic species for rehabilitation efforts following wildfire are common on rangelands in the western United States, though ecological impacts of exotic species in novel environments are often poorly understood. One such introduced species, Kochia prostrata (L.) Schrad (forage kochia) has been seeded on...

**Author(s): Erin C. Gray, Patricia S. Muir**

**Year Published:** 2013

**Type:** Document

**Book or Chapter or Journal Article**

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**Appendix 3: Response of western mountain ecosystems to climatic variability and change: a synthesis from the Western Mountain Initiative**

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**

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**Resistance to invasives and altered fire regimes differs between cold and hot desert shrublands**

Settlement by Anglo-Americans in the desert shrublands of North America has resulted in the introduction and subsequent invasion of multiple nonnative invasive grass species. These invasions have altered pre-settlement fire regimes, converted native perennial shrublands to nonnative annual grasslands, and placed many native desert...

**Author(s): Matthew L. Brooks, Jeanne C. Chambers**

**Year Published:** 2013

**Type:** Document

**Book or Chapter or Journal Article**

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**Regional and forest-level estimates of carbon stored in harvested wood products from the United States Forest Service Northern Region, 1906-2010**

Global forests capture and store significant amounts of CO2 through photosynthesis. When carbon is
removed from forests through harvest, a portion of the harvested carbon is stored in wood products, often for many decades. The United States Forest Service (USFS) and other agencies are interested in accurately accounting for carbon...

Author(s): Nathaniel Anderson, Jesse Young, Keith Stockmann, Kenneth E. Skog, Sean P. Healey, Dan R. Loeffler, J. Greg Jones, James F. Morrison
Year Published: 2013
Type: Document
Technical Report or White Paper

A review of fire effects on vegetation and soils in the Great Basin Region: response and ecological site characteristics
www.nrfirescience.org/resource/12147
This review synthesizes the state of knowledge on fire effects on vegetation and soils in semi-arid ecosystems in the Great Basin Region, including the central and northern Great Basin and Range, Columbia River Basin, and the Snake River Plain. We summarize available literature related to: (1) the effects of environmental gradients...
Author(s): Richard F. Miller, Jeanne C. Chambers, David A. Pyke, Frederick B. Pierson
Year Published: 2013
Type: Document
Synthesis, Technical Report or White Paper

The merits of prescribed fire outweigh potential carbon emission effects
www.nrfirescience.org/resource/12426
While North American ecosystems vary widely in their ecology and natural historical fire regimes, they are unified in benefitting from prescribed fire when judiciously applied with the goal of maintaining and restoring native ecosystem composition, structure, and function. On a modern landscape in which historical fire regimes...
Author(s): Association for Fire Ecology, International Association of Wildland Fire, Tall Timbers Research Station, The Nature Conservancy
Year Published: 2013
Type: Document
Technical Report or White Paper

Living dangerously on borrowed time during slow, unrecognized regime shifts
www.nrfirescience.org/resource/16806
Regime shifts from one ecological state to another are often portrayed as sudden, dramatic, and difficult to reverse. Yet many regime shifts unfold slowly and imperceptibly after a tipping point has been exceeded, especially at regional and global scales. These long, smooth transitions between equilibrium states are easy to miss,...
Author(s): Terry P. Hughes, Cristina Linares, Vasilis Dakos, Ingrid A. van de Leemput, Egbert H. van Nes
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Health, reproduction, and fuels in whitebark pine in the Frank Church River of No Return Wilderness Area in central Idaho (Project INT-F-05-02)
www.nrfirescience.org/resource/12010
Whitebark pine (Pinus albicaulis Engelm.) is in serious decline across its range, largely due to the combined effects of Cronartium ribicola J. C. Fisch (an introduced fungal pathogen that causes white pine blister rust), replacement by late successional species, and widespread infestation of mountain
pine beetle (Dendroctonus... 
Author(s): Lauren Fins, Ben Hoppus 
Year Published: 2013 
Type: Document 
Technical Report or White Paper

Summary of science, activities, programs, and policies that influence the rangewide conservation of greater sage-grouse (Centrocercus urophaiianus) 
www.nrfirescience.org/resource/15420
Because of their broad range, variations in population traits and characteristics across this range, and the variability in habitat conditions and threats within this range, conservation of sage-grouse is a unique challenge compared to isolated or range-restricted species, primarily due to the scale of the effort. This complexity is...
Year Published: 2013 
Type: Document 
Technical Report or White Paper

Foliar moisture content variations in lodgepole pine over the diurnal cycle during the red stage of mountain pine beetle attack 
www.nrfirescience.org/resource/12141
Widespread outbreaks of the mountain pine beetle (Dendroctonus ponderosae Hopkins) in the lodgepole pine (Pinus contorta Dougl. ex Loud. var. latifolia Engelm.) forests of North America have produced stands with significant levels of recent tree mortality. The needle foliage from recently attacked trees typically turns red within...
Author(s): Wesley G. Page, Michael J. Jenkins, Martin E. Alexander 
Year Published: 2013 
Type: Document 
Book or Chapter or Journal Article

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

Appendix 1: Regional summaries - Great Plains 
www.nrfirescience.org/resource/11902
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
Introduced annual grass increases regional fire activity across the arid western USA (1980-2009)
www.nrfirescience.org/resource/12110
Non-native, invasive grasses have been linked to altered grass-fire cycles worldwide. Although a few studies have quantified resulting changes in fire activity at local scales, and many have speculated about larger scales, regional alterations to fire regimes remain poorly documented. We assessed the influence of large-scale Bromus...
Author(s): Jennifer Balch, Bethany A. Bradley, Carla M. D'Antonio, Jose Gomez-Dans
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Carbon stocks of trees killed by bark beetles and wildfire in the western United States
www.nrfirescience.org/resource/13090
Forests are major components of the carbon cycle, and disturbances are important influences of forest carbon. Our objective was to contribute to the understanding of forest carbon cycling by quantifying the amount of carbon in trees killed by two disturbance types, fires and bark beetles, in the western United States in recent...
Author(s): Jeffrey A. Hicke, Arjan J. H. Meddens, Craig D. Allen, Crystal A. Kolden
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

The many elements of traditional fire knowledge: synthesis, classification, and aids to cross-cultural problem solving in fire-dependent systems around the world
www.nrfirescience.org/resource/12537
I examined the hypothesis that traditional social-ecological fire systems around the world include common elements of traditional fire knowledge (TFK). I defined TFK as fire-related knowledge, beliefs, and practices that have been developed and applied on specific landscapes for specific purposes by long time inhabitants. In all, 69...
Author(s): Mary R. Huffman
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Using native annual plants to restore post-fire habitats in western North America
www.nrfirescience.org/resource/12139
Increasing fire frequencies and uncharacteristic severe fires have created a need for improved restoration methods across rangelands in western North America. Traditional restoration seed mixtures of native perennial mid- to late-seral plant species may not be suitable for intensely burned sites that have been returned to an early-...
Author(s): Christopher M. Herron, Jayne L. Jonas, Paul J. Meiman, Mark W. Paschke
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

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

Fire as a dimension of historical ecology: a response to Bowman et al. (2011)

Bowman et al. (Journal of Biogeography, 2011, 38, 2223–2236) attempt a synthesis of the current status of study into human use of fire as an ecosystem management tool and provide a framework for guiding research on the human dimensions of global fire. While we applaud this ambitious effort, we believe the proposed 'pyric phase'...

Author(s): Michael R. Coughlan, Aaron M. Petty
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

An individual-based process model to simulate landscape-scale forest ecosystem dynamics

Forest ecosystem dynamics emerges from nonlinear interactions between adaptive biotic agents (i.e., individual trees) and their relationship with a spatially and temporally heterogeneous abiotic environment. Understanding and predicting the dynamics resulting from these complex interactions is crucial for the sustainable stewardship...

Author(s): Rupert Seidl, Werner Rammer, Robert M. Scheller, Thomas A. Spies
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Aquatic species invasions in the context of fire and climate change

This paper focuses on the nexus among native and nonnative fishes with respect to fire and climate change in the western United States. Although many taxa are involved, I emphasize native and nonnative salmonids because these are obligate coldwater species that might be expected to respond strongly to fire and because most research...

Author(s): Michael K. Young
Year Published: 2012
Type: Document
Technical Report or White Paper

Interactions of whitepine blister rust and mountain pine beetle in whitebark pine ecosystems in the southern Greater Yellowstone Ecosystem

Whitebark pine (Pinus albicaulis) is a fundamental component of alpine and subalpine habitats in the Greater Yellowstone Ecosystem. The magnitude of current white pine blister rust (WPBR) infection caused by the pathogen Cronartium ribicola and mountain pine beetle (MPB; Dendroctonus ponderosae) impacts, combined with the effect of...

Author(s): Nancy K. Bockino, Daniel B. Tinker
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

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

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

Cascading impacts of bark beetle-caused tree mortality on coupled biogeophysical and biogeochemical processes
www.nrfirescience.org/resource/8345
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
Book or Chapter or Journal Article, Synthesis
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

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

Do mountain pine beetle outbreaks change the probability of active crown fire in lodgepole pine forests? Comment 1 & 2, Reply 1  
www.nrfirescience.org/resource/13342  
Comment 1 - Simard et al. (2011) have produced a comprehensive data set and analysis concerning mountain pine beetle (MPB; Dendroctonus ponderosae)-caused mortality and associated crown fire feedbacks in lodgepole pine (Pinus contorta)-dominated forests. Misapplication of the NEXUS fire modeling system (Scott and...

Author(s): Christopher J. Moran, Mark A. Cochrane, William Matt Jolly, Russell A. Parsons, J. Morgan Varner, Bret W. Butler, Kevin C. Ryan, Corey L. Gucker, Martin Simard, William H. Romme, Monica G. Turner  
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

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

Effects of bark beetle-caused tree mortality on wildfire
www.nrfirescience.org/resource/13294
Millions of trees killed by bark beetles in western North America have raised concerns about subsequent wildfire, but studies have reported a range of conclusions, often seemingly contradictory, about effects on fuels and wildfire. In this study, we reviewed and synthesized the published literature on modifications to fuels and fire... 
Author(s): Jeffrey A. Hicke, Morris C. Johnson, Jane L. Hayes, Haiganoush K. Preisler 
Year Published: 2012 
Type: Document 
Book or Chapter or Journal Article, Synthesis

A common-garden study of resource-island effects on a native and an exotic, annual grass after fire
www.nrfirescience.org/resource/11474
Plant-soil variation related to perennial-plant resource islands (coppices) interspersed with relatively bare interspaces is a major source of heterogeneity in desert rangelands. Our objective was to determine how native and exotic grasses vary on coppice mounds and interspaces (microsites) in unburned and burned sites and... 
Author(s): Amber N. Hoover, Matthew J. Germino 
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
Postfire downy brome (Bromus tectorum) invasion at high elevations in Wyoming

The invasive annual grass downy brome is the most ubiquitous weed in sagebrush systems of western North America. The center of invasion has largely been the Great Basin region, but there is an increasing abundance and distribution in the Rocky Mountain States. We evaluated postfire vegetation change using very large-scale aerial (...)

Author(s): Brian A. Mealer, Samuel Cox, D. Terrance Booth
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Cornus canadensis (bunchberry)

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

Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. forest sector

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

Numerical simulation of crown fire hazard immediately after bark beetle-caused mortality in lodgepole pine forests

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

Spatially extensive reconstructions show variable-severity fire and heterogeneous structure in historical western United States dry forests

www.nrfirescience.org/resource/12122
www.nrfirescience.org/resource/10680
www.nrfirescience.org/resource/12567
www.nrfirescience.org/resource/8325
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

Wildfire triage: targeting mitigation based on social, economic, and ecological values
www.nrfirescience.org/resource/16178
Evaluating the risks of wildfire relative to the valuable resources found in any managed landscape requires an interdisciplinary approach. Researchers at the Rocky Mountain Research Station and Western Wildland Threat Assessment Center developed such a process, using a combination of techniques rooted in fire modeling and ecology,...

Author(s): Karl Malcolm, Matthew P. Thompson, David E. Calkin, Mark A. Finney, Alan A. Ager
Year Published: 2012
Type: Document
Research Brief or Fact Sheet

Fire effects on noxious weeds
www.nrfirescience.org/resource/12003
The Fire Effects Information System (FEIS, www.fs.fed.us/database/feis/) has been providing reviews of scientific knowledge about fire effects since 1986. FEIS is an online collection of literature reviews on more than 1,100 species and their relationships with fire. Reviews cover plants and animals throughout the United States,...

Author(s): Robin J. Innes
Year Published: 2012
Type: Document
Research Brief or Fact Sheet

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
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
Climate change models for the northern Rocky Mountains predict changes in temperature and water availability that in turn will alter vegetation. Changes include timing of plant life-history events, or phenology, such as green-up, flowering and senescence, and shifts in species composition. Moreover, climate changes may favor...

Author(s): Geneva W. Chong, Leslie A. Allen
Year Published: 2012
Type: Document
Research Brief or Fact Sheet
This FEIS species review synthesizes information on the relationship of Quercus macrocarpa (bur oak) 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: 2011
Type: Document

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

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

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

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

Antennaria parvifolia (littleleaf pussytoes)

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...

Author(s): Janet L. Fryer
Year Published: 2011
Type: Document

Fire, plant invasions, and erosion events on western rangelands

 Millions of hectares of rangeland in the western United States have been invaded by annual and woody plants that have increased the role of wildland fire. Altered fire regimes pose significant implications for runoff and erosion. In this paper we synthesize what is known about fire impacts on rangeland hydrology and erosion, and how...

Author(s): Frederick B. Pierson, Christopher Jason Williams, Stuart P. Hardegree, Mark A. Weltz, Jeffry
The magnificent high-elevation five-needle white pines: ecological roles and future outlook
www.nrfirescience.org/resource/11895
The High Five symposium is devoted to exchanging information about a small group of pines with little commercial value but great importance to the ecology of high-mountain ecosystems of the West. These High Five pines include the subalpine and treeline species-whitebark (Pinus albicaulis), Rocky Mountain bristlecone (P. aristata),...
Author(s): Diana F. Tomback, Peter Achuff, Anna W. Schoettle, John W. Schwandt, Ron J. Mastrogiuseppe

Influence of fire on native and nonnative salmonid populations and habitat in a western Montana basin
www.nrfirescience.org/resource/8286
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...
Author(s): Clint M. Sestrich, Thomas E. McMahon, Michael K. Young

Canyon grassland vegetation changes following fire in northern Idaho
www.nrfirescience.org/resource/12049
Native and nonnative vegetation mosaics are common in western rangelands. If land managers could better predict changes in the abundance of native and nonnative species following disturbances, maintenance of native plant cover and diversity may be improved. In August 2000, during suppression of a wildfire near Lewiston, Idaho, a...
Author(s): Corey L. Gucker, Stephen C. Bunting

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
The forgotten stage of forest succession: early successional ecosystems on forest sites
www.nrfirescience.org/resource/17459
Early-successional forest ecosystems that develop after stand-replacing or partial disturbances are diverse in species, processes, and structure. Post-disturbance ecosystems are also often rich in biological legacies, including surviving organisms and organically derived structures, such as woody debris. These legacies and...
Author(s): Mark E. Swanson, Jerry F. Franklin, Robert L. Beschta, Charles M. Crisafulli, Dominick A. DellaSala, Richard L. Hutto, David B. Lindenmayer, Frederick J. Swanson
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Hieracium caespitosum (meadow hawkweed)
www.nrfirescience.org/resource/10473
This FEIS species review synthesizes information on the relationship of Hieracium caespitosum (meadow 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: 2011
Type: Document
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 species' taxonomy,...
Author(s): Corey L. Gucker
Year Published: 2011
Type: Document
Synthesis

Amorpha canescens (leadplant)
www.nrfirescience.org/resource/10659
This FEIS species review synthesizes information on the relationship of Amorpha canescens (leadplant) 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: 2011
Type: Document
Synthesis

Picoides arcticus (black-backed woodpecker)
www.nrfirescience.org/resource/10857
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,
The future of high-elevation, five-needle white pines in western North America: Proceedings of the High Five Symposium. 28-30 June 2010; Missoula, MT
www.nrfirescience.org/resource/11894

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

Fuel and fire behavior in high-elevation five-needle pines affected by mountain pine beetle
www.nrfirescience.org/resource/12112

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...

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,...

Rocky Mountain Research Station invasive species visionary white paper
www.nrfirescience.org/resource/11236

Invasive species represent one of the single greatest threats to natural ecosystems and the services they provide. Effectively addressing the invasive species problem requires management that is based on sound research. We provide an overview of recent and ongoing invasive species research conducted by Rocky Mountain Research...
Disturbance ecology of high-elevation five-needle pine ecosystems in western North America

This paper synthesizes existing information about the disturbance ecology of high-elevation five-needle pine ecosystems, describing disturbances regimes, how they are changing or are expected to change, and the implications for ecosystem persistence. As it provides the context for ecosystem conservation/restoration programs, we...

Author(s): Elizabeth M. Campbell, Robert E. Keane, Evan R. Larson, Michael P. Murray, Anna W. Schoettle, Carmen Wong
Year Published: 2011
Type: Document
Conference Proceedings, Synthesis

Cervus elaphus (elk)

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
Synthesis

Economic and social impacts of wildfires and invasive plants in American deserts: lessons from the Great Basin

Research on the impacts of wildfire and invasive plants in rangelands has focused on biophysical rather than human dimensions of these environmental processes. We offer a synthetic perspective on economic and social aspects of wildfire and invasive plants in American deserts, focusing on the Great Basin because greater research...

Author(s): Mark W. Brunson, John A. Tanaka
Year Published: 2011
Type: Document
Book or Chapter or Journal Article, Synthesis

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

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

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
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

Oreamnos americanus (mountain goat)
www.nrfirescience.org/resource/10522
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,...
Author(s): Robin J. Innes
Year Published: 2011
Type: Document
Synthesis

Beyond fire behavior and fuels: learning from the past to help guide us in the future
www.nrfirescience.org/resource/18397
The third IAWF Fire Behavior and Fuels Conference was held in Spokane, Washington, October 25-29, 2010, and commemorated the 100th anniversary of the 1910 fires in the Northern Rocky Mountains. The theme of the conference was appropriately titled ‘Beyond Fire Behavior and Fuels: Learning from the Past to Help Guide Us in the...
Year Published: 2011
Type: Document
Conference Proceedings

Fire effects on the cheatgrass seed bank pathogen Pyrenophora semeniperda
www.nrfirescience.org/resource/11450
The generalist fungal pathogen Pyrenophora semeniperda occurs primarily in cheatgrass (Bromus tectorum) seed banks, where it causes high mortality. We investigated the relationship between this pathogen and its cheatgrass host in the context of fire, asking whether burning would facilitate host escape from the pathogen or increase...
Author(s): Julie Beckstead, Laura E. Street, Susan E. Meyer, Phil S. Allen
Year Published: 2011
Type: Document
Book or Chapter or Journal Article
Alnus incana, Alnus incana subsp. rugosa, Alnus incana subsp. tenuifolia (gray alder, speckled alder, thinleaf alder)
www.nrfirescience.org/resource/10660
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....
Author(s): Janet L. Fryer
Year Published: 2011
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

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

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
Synthesis

The forgotten stage of forest succession: early-successional ecosystems on forest sites
www.nrfirescience.org/resource/14597
Early-successional forest ecosystems that develop after stand-replacing or partial disturbances are diverse in species, processes, and structure. Post-disturbance ecosystems are also often rich in
biological legacies, including surviving organisms and organically derived structures, such as woody debris. These legacies and...
Author(s): Mark E. Swanson, Jerry F. Franklin, Robert L. Beschta, Charles M. Crisafulli, Dominick A. DellaSala, Richard L. Hutto, David B. Lindenmayer, Frederick J. Swanson
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

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

Coronilla varia (crownvetch)
www.nrfirescience.org/resource/10452
This FEIS species review synthesizes information on the relationship of Coronilla varia (crownvetch) 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
Synthesis

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

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
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
Synthesis

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

Effect of fire on a seed bank pathogen and on seeds of its host Bromus tectorum
www.nrfirescience.org/resource/11462
The generalist pathogen Pyrenophora semeniperda (Brittlebank and Adam) Shoemaker occurs primarily in cheatgrass (Bromus tectorum L.) seed banks, where it causes high seed mortality (Beckstead et al. 2007; Meyer et al. 2007). How does fire impact survival of a fungal seed pathogen, P. semeniperda, versus survival of the seeds of its...
Author(s): Julie Beckstead, Susan E. Meyer, Laura E. Street, Phil S. Allen
Year Published: 2010
Type: Document
Conference Proceedings

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
Type: Document
Synthesis

Populus alba, Populus x canescens, Populus x heimburgeri, Populus x rouleauiana, Populus x tomentosa (white poplar, gray poplar, Heimburger's poplar, Roulwau's poplar, Chinese white poplar)
www.nrfirescience.org/resource/10457
This FEIS species review synthesizes information on the relationship of Populus alba, Populus x
canescens, Populus x heimburgeri, Populus x rouleuiana, Populus x tomentosa (white poplar, gray poplar, Heimburger's poplar, Roulwau's poplar, Chinese white poplar) to fire--how fire affects the species and its habitat, invasiveness of...

Author(s): Corey L. Gucker
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

**Falco peregrinus (peregrine falcon)**

www.nrfirescience.org/resource/10748

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

**Disturbance and landscape dynamics in a changing world**

www.nrfirescience.org/resource/13432

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

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

**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
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

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

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

Populus alba and hybrids
www.nrfirescience.org/resource/16368
This document covers several species of Populus and includes their general distribution, habitat types, plant communities, and fire adaptations.
Author(s): Corey L. Gucker
Year Published: 2010
Type: Document

Management guide to ecosystem restoration treatments: whitebark pine forests of the Northern Rocky Mountains, U.S.A.
www.nrfirescience.org/resource/11143
Whitebark pine is declining across much of its range in North America because of the combined effects of mountain pine beetle epidemics, fire exclusion policies, and widespread exotic blister rust infections. This management guide summarizes the extensive data collected at whitebark pine treatment sites for
Post-wildfire seeding in forests of the western United States: an evidence-based review

Broadcast seeding is one of the most widely used post-wildfire emergency response treatments intended to reduce soil erosion, increase vegetative ground cover, and minimize establishment and spread of non-native plant species. We conducted an evidence-based review to examine the effectiveness and effects of post-wildfire seeding...

Blister rust and western forest biodiversity: ecology, values and outlook for white pines

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...

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...

Ailanthus altissima (tree-of-heaven)

This FEIS species review synthesizes information on the relationship of Ailanthus altissima (tree-of-heaven) 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....
**Artemisia nova (black sagebrush)**

This FEIS species review synthesizes information on the relationship of Artemisia nova (black 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, and...

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

**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 ecology in Rocky Mountain landscapes**

Fire Ecology in Rocky Mountain Landscapes brings a century of scientific research to bear on improving the relationship between people and fire. In recent years, some scientists have argued that current patterns of fire are significantly different from historical patterns, and that landscapes should be managed with an eye toward...

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

**Reciprocal interactions between bark beetles and wildfire in subalpine forests: landscape patterns and the risk of high-severity fire - Final Report to the Joint Fire Science Program**

The interactions of wildfire and bark beetle outbreaks and their reciprocal influences on fire behavior, bark beetle dynamics, and ecosystem structure are critical research issues in many coniferous forests of the Intermountain West. We combined field studies with new remote sensing methods to address three main questions regarding...

Author(s): Daniel B. Tinker
Year Published: 2009
Type: Document
Technical Report or White Paper

**Variable impacts of imazapic rate on downy brome (Bromus tectorum) and seeded species in two rangeland communities**

The herbicide imazapic is registered for use on rangelands and provides effective short-term control of certain invasive annual grasses. However, details about optimal application rates for downy brome and susceptibility of simultaneously seeded species are lacking. Thus, we investigated downy brome and
seeded species responses to...
Author(s): Christo Morris, Thomas A. Monaco, Craig W. Rigby
Year Published: 2009
Type: Document
Book or Chapter or Journal Article

Review of literature on climate change and forest diseases of western North America
www.nrfirescience.org/resource/11232
A summary of the literature on relationships between climate and various types of tree diseases, and
the potential effects of climate change on pathogens in western North American forests is provided.
Climate change generally will lead to reductions in tree health and will improve conditions for some
highly damaging pathogens....
Author(s): John T. Kliejunas, Brian W. Geils, Jessie M. Glaeser, Ellen M. Goheen, Paul E. Hennon,
Mee-Sook Kim, Harry Kope, Jeffry J. Stone, Rona Sturrock, Susan J. Frankel
Year Published: 2009
Type: Document
Synthesis, Technical Report or White Paper

Festuca thurberi (Thurber fescue)
www.nrfirescience.org/resource/10797
This FEIS species review synthesizes information on the relationship of Festuca thurberi (Thurber
fescue) 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: 2009
Type: Document
Synthesis

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

The '88 Fires: Yellowstone and Beyond IAWF Conference Proceedings
www.nrfirescience.org/resource/18464
Description not available
Author(s): Ronald E. Masters, Krista E. M. Galley, Don G. Despain
Year Published: 2009
Type: Document
Conference Proceedings

Tanacetum vulgare (common tansy)
This FEIS species review synthesizes information on the relationship of Tanacetum vulgare (common tansy) 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

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

Grus canadensis, Grus canadensis canadensis, Grus canadensis nesiotes, Grus canadensis pratensis, Grus canadensis pulla, Grus canadensis rowani, Grus canadensis tabida (sandhill crane species)
[Full Title: Grus canadensis, Grus canadensis canadensis, Grus canadensis nesiotes, Grus canadensis pratensis, Grus canadensis pulla, Grus canadensis rowani, Grus canadensis tabida (sandhill crane, lesser sandhill crane, Cuban sandhill crane, Florida sandhill crane, Mississippi sandhill crane, Canadian sandhill crane, greater....
Author(s): Katharine R. Stone
Year Published: 2009
Type: Document
Synthesis

Potentilla hippiana (woolly cinquefoil)
This FEIS species review synthesizes information on the relationship of Potentilla hippiana (woolly 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): Rachelle Meyer
Year Published: 2009
Type: Document
Synthesis

Muhlenbergia cuspidata (stonyhills muhly)
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....
Bark beetle responses to vegetation management treatments
www.nrfirescience.org/resource/11070
Native tree-killing bark beetles (Coleoptera: Curculionidae, Scolytinae) are a natural component of forest ecosystems. Eradication is neither possible nor desirable and periodic outbreaks will occur as long as susceptible forests and favorable climatic conditions co-exist. Recent changes in forest structure and tree composition by...

Artemisia papposa (Owyhee sagebrush)
www.nrfirescience.org/resource/10799
This FEIS species review synthesizes information on the relationship of Artemisia papposa (Owyhee 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,...

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...

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,...

Tree squirrel habitat selection and predispersal seed predation in a declining subalpine conifer
Differential responses by species to modern perturbations in forest ecosystems may have undesirable impacts on plant-animal interactions. If such disruptions cause declines in a plant species without corresponding declines in a primary seed predator, the effects on the plant could be exacerbated. We examined one such interaction...

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

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

Fire and bark beetle interactions

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

Cheatgrass and red brome; the history and biology of two invaders

In recent history, there has not been a more ecologically important event than the introduction of cheatgrass (Bromus tectorum) and red brome (Bromus rubens) into the Intermountain West. These grasses are very similar in ecology and history and are separated mostly by function of elevation. Both species are from the Mediterranean...

Author(s): Chad R. Reid, Sherel Goodrich, James E. Bowns
Year Published: 2008
Type: Document
Conference Proceedings

The effects of hazardous fuel reduction treatments in the wildland urban interface on the activity of bark beetles infesting ponderosa pine

Selective logging, fire suppression, forest succession, and climatic changes have resulted in high fire hazards over large areas of the western United States. Federal and state hazardous fuel reduction programs have increased accordingly to reduce the risk, extent and severity of these events, particularly in the wildland urban...
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

Chapter 16. Fire and nonnative plants—summary and conclusions
www.nrfirescience.org/resource/12583

This volume synthesizes scientific information about interactions between fire and nonnative invasive plants in wildlands of the United States. If the subject were clear and simple, this volume would be short; obviously, it is not.

Author(s): Jane Kapler Smith, Kristin L. Zouhar, Steve Sutherland, Matthew L. Brooks
Year Published: 2008
Type: Document
Synthesis, Technical Report or White Paper

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

Chapter 12. Gaps in scientific knowledge about fire and nonnative invasive plants
www.nrfirescience.org/resource/12563

The potential for nonnative, invasive plants to alter an ecosystem depends on species traits, ecosystem characteristics, and the effects of disturbances, including fire. This study identifies gaps in science-based knowledge about the relationships between fire and nonnative invasive plants in the United States. The literature was...

Author(s): Kristin L. Zouhar, Gregory T. Munger, Jane Kapler Smith
Year Published: 2008
Type: Document
Synthesis, Technical Report or White Paper
Zuckia brandegeei (siltbush)
www.nrfirescience.org/resource/10667
This FEIS species review synthesizes information on the relationship of Zuckia brandegeei (siltbush) 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: 2008
Type: Document
Synthesis

Chapter 2. Effects of fire on nonnative invasive plants and invasibility of wildland ecosystems
www.nrfirescience.org/resource/12532
Considerable experimental and theoretical work has been done on general concepts regarding nonnative species and disturbance, but experimental research on the effects of fire on nonnative invasive species is sparse. We begin this chapter by connecting fundamental concepts from the literature of invasion ecology to fire. Then we...
Author(s): Kristin L. Zouhar, Jane Kapler Smith, Steve Sutherland
Year Published: 2008
Type: Document
Synthesis, Technical Report or White Paper

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

Beetles are supercool! - Understanding the life cycle of mountain pine beetles
www.nrfirescience.org/resource/8330
As a global citizen, you know that people around the world share similar environmental concerns. The changing climate is one concern shared by people everywhere. Some Forest Service scientists are interested in studying climate change and its relationship to forests, grasslands, air, and water. You will learn about one of these...
Author(s): Barbara McDonald, Vicki Arthur, Jessica Nickelsen, Michelle Andrews
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
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

Fire, native species, and soil resource interactions influence the spatio-temporal invasion pattern of Bromus tectorum
www.nrfirescience.org/resource/8362
Bromus tectorum (cheatgrass) is an invasive annual that occupies perennial grass and shrub communities throughout the western United States. Bromus tectorum exhibits an intriguing spatio-temporal pattern of invasion in low elevation ponderosa pine Pinus ponderosa/bunchgrass communities in western Montana where it forms dense rings...
Author(s): Michael J. Gundale, Steve Sutherland, Thomas H. DeLuca
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Great Basin aspen ecosystems
www.nrfirescience.org/resource/16372
The health of quaking aspen (Populus tremuloides) in the Great Basin is of growing concern. The following provides an overview of aspen decline and die-off in areas within and adjacent to the Great Basin and suggests possible directions for research and management. For more detailed information, please see the list of references and...
Author(s): Dale L. Bartos
Year Published: 2008
Type: Document
Technical Report or White Paper

Influence of coarse wood and pine saplings on nitrogen mineralization and microbial communities in young post-fire Pinus contorta
www.nrfirescience.org/resource/18459
Nitrogen (N) limits productivity in many coniferous forests of the western US, but the influence of post-fire structure on N cycling rates in early successional stands is not well understood. We asked if the heterogeneity created by downed wood and regenerating pine saplings affected N mineralization and microbial community...
Author(s): Kristine L. Metzger, Erica A. H. Smithwick, Daniel B. Tinker, William H. Romme, Teri C. Balser, Monica G. Turner
Year Published: 2008
Type: Document
Book or Chapter or Journal Article
Dryopteris campyloptera, Dryopteris carthusiana, Dryopteris expansa, Dryopteris intermedia (mountain woodfern, spinulose woodfern, spreading woodfern, fancy fern)

www.nrfirescience.org/resource/10803

This FEIS species review synthesizes information on the relationship of Dryopteris campyloptera, Dryopteris carthusiana, Dryopteris expansa, Dryopteris intermedia (mountain woodfern, spinulose woodfern, spreading woodfern, fancy fern) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire...

Author(s): Gregory T. Munger
Year Published: 2008
Type: Document
Synthesis

Sanguisorba minor (small burnet)

www.nrfirescience.org/resource/10656

This FEIS species review synthesizes information on the relationship of Sanguisorba minor (small burnet) 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: 2008
Type: Document
Synthesis

Big changes in the Great Basin

www.nrfirescience.org/resource/12131

JFSP-funded researchers are exploring the ecological functioning of sagebrush-steppe communities in the Great Basin and other places in the dry Intermountain West. Their work is helping managers effectively use tools such as tree mastication and prescribed fire to help these communities become more resilient in the face of invasive...

Author(s): Gail Wells
Year Published: 2008
Type: Document
Research Brief or Fact Sheet

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

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
Cross-scale drivers of natural disturbances prone to anthropogenic amplification: the dynamics of bark beetle eruptions

www.nrfirescience.org/resource/16887

Biome-scale disturbances by eruptive herbivores provide valuable insights into species interactions, ecosystem function, and impacts of global change. We present a conceptual framework using one system as a model, emphasizing interactions across levels of biological hierarchy and spatiotemporal scales. Bark beetles are major natural...

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

Holocene records of Dendroctonus bark beetles in high elevation pine forests of Idaho and Montana, USA

www.nrfirescience.org/resource/8224

Paleoecological reconstructions from two lakes in the U.S. northern Rocky Mountain region of Idaho and Montana revealed the presence of bark beetle elytra and head capsules (cf. Dendroctonus spp., most likely D. ponderosae, mountain pine beetle). Occurrence of these macrofossils during the period of time associated with the 1920/...

Author(s): Andrea R. Brunelle, Gerald E. Rehfeldt, Barbara J. Bentz, A. Steven Munson
Year Published: 2008
Type: Document
Book or Chapter or Journal Article

Aulacomnium palustre (ribbed bog moss)

www.nrfirescience.org/resource/10646

This FEIS species review synthesizes information on the relationship of Aulacomnium palustre (ribbed bog 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 biology...

Author(s): Janet L. Fryer
Year Published: 2008
Type: Document
Synthesis

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
The tao of treating weeds: reaching for restoration in the northern Rocky Mountains

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

Arctostaphylos rubra (red fruit bearberry)

This FEIS species review synthesizes information on the relationship of Arctostaphylos rubra (red fruit bearberry) 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

Wildland fire in ecosystems: fire and nonnative invasive plants

This state-of-knowledge review of information on relationships between wildland fire and nonnative invasive plants can assist fire managers and other land managers concerned with prevention, detection, and eradication or control of nonnative invasive plants. The 16 chapters in this volume synthesize ecological and botanical...

Year Published: 2008
Type: Document
Synthesis, Technical Report or White Paper

Landscape heterogeneity following large fires: insights from Yellowstone National Park, USA

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 focusing 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

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,
Climate change impacts on northwestern and intermountain United States rangelands

Our focus is on the Pacific Northwest and Intermountain Region including the Great Basin, Columbia Plateau, Colorado Plateau, and surrounding areas. The climate of this large, arid to semiarid region is defined by generally low and highly variable precipitation. Much of the yearly precipitation arrives as winter snow because most of...

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

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

Neotoma cinerea (bushy-tailed woodrat)

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...

Fragaria vesca (woodland strawberry)

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,...
Sphaeralcea grossulariifolia (gooseberryleaf globemallow)
www.nrfirescience.org/resource/10894
This FEIS species review synthesizes information on the relationship of Sphaeralcea grossulariifolia (gooseberryleaf globemallow) 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): Jennifer E. Tollefson
Year Published: 2007
Type: Document
Synthesis

Restoration classes based on blister rust infection and grizzly bear recovery zones - Map
www.nrfirescience.org/resource/11509
Mapped locations of restoration classes based on blister rust infection and grizzly bear recovery zones within the western United States.
Author(s): Fire Modeling Institute
Year Published: 2007
Type: Document
Research Brief or Fact Sheet

Birds and burns of the Interior West: descriptions, habitats, and management in western forests
www.nrfirescience.org/resource/11123
This publication provides information about prescribed fire effects on habitats and populations of birds of the interior West and a synthesis of existing information on bird responses to fire across North America. Our literature synthesis indicated that aerial, ground, and bark insectivores favored recently burned habitats, whereas...
Author(s): Victoria A. Saab, William M. Block, Robin E. Russell, John F. Lehmkuhl, Lisa Bate, Rachel White
Year Published: 2007
Type: Document
Synthesis, Technical Report or White Paper

Postfire invasion potential of rush skeletonweed (Chondrilla juncea)
www.nrfirescience.org/resource/11455
North American sagebrush steppe communities have been transformed by the introduction of invasive annual grasses and subsequent increase in fire size and frequency. We examined the effects of wildfires and environmental conditions on the ability of rush skeletonweed (Chondrilla juncea L.), a perennial Eurasian composite, to invade...
Author(s): Cecilia Lynn Kinter, Brian A. Mealor, Nancy L. Shaw, Ann L. Hild
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

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
Hedysarum alpinum (alpine sweetvetch)
www.nrfirescience.org/resource/10672
This FEIS species review synthesizes information on the relationship of Hedysarum alpinum (alpine sweetvetch) 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

The fire environment--innovations, management, and policy; conference proceedings
www.nrfirescience.org/resource/18398
The International Association of Wildland Fire sponsored the second Fire Behavior and Fuels conference in Destin, Florida. The conference theme was 'Fire Environment--Innovations, Management, and Policy.' Over 450 attendees participated in presentations on the latest innovations in wildland fire management, examples of successful...
Author(s): Wayne A. Cook, Bret W. Butler
Year Published: 2007
Type: Document
Conference Proceedings

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

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

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

**Rangifer tarandus (caribou)**
www.nrfirescience.org/resource/10746
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

**Tough trees at timberline - whitebark pines in peril**
www.nrfirescience.org/resource/8392
This article describes the whitebark pine tree and the tough environment it lives in, the hazards it faces, and how it fits the environment ecologically.

Author(s): Jane Kapler Smith
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

**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
Book or Chapter or Journal Article

**Mustela nigripes (black-footed ferret)**
www.nrfirescience.org/resource/10903
This FEIS species review synthesizes information on the relationship of Mustela nigripes (black-footed ferret) 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
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...
Author(s): Sonja L. Reeves
Year Published: 2007
Type: Document
Synthesis

Geranium bicknellii (Bicknell's geranium)
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
Synthesis

Predicting postfire Douglas-fir beetle attacks and tree mortality in the Northern Rocky Mountains
www.nrfirescience.org/resource/8363
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

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

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,
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

Post-fire recovery of Wyoming big sagebrush shrub-steppe in central and southeast Montana

www.nrfirescience.org/resource/15386

Sagebrush is a widespread habitat throughout our study area and a number of species including Greater Sage-grouse, pronghorn, Brewers Sparrow, Sage Sparrow, Sage Thrasher and sagebrush vole are sagebrush dependent, at least at some stage of their life cycles. Fire constitutes an important driver in structuring sagebrush ecosystems:...

Author(s): Stephen V. Cooper, Peter Lesica, Greg Kudray
Year Published: 2007
Type: Document
Book or Chapter or Journal Article

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
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
Linum lewisii (Lewis flax)
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
Synthesis

Arctostaphylos patula (greenleaf manzanita)
www.nrfirescience.org/resource/10705
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...
Author(s): Alan S. Hauser
Year Published: 2007
Type: Document
Synthesis

Cynomys ludovicianus (black-tailed prairie dog)
www.nrfirescience.org/resource/10898
This FEIS species review synthesizes information on the relationship of Cynomys ludovicianus (black-tailed prairie dog) 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): Elena D. Ulev
Year Published: 2007
Type: Document
Synthesis

Strix nebulosa (great gray owl)
www.nrfirescience.org/resource/10900
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

Artemisia campestris (field sagewort)
www.nrfirescience.org/resource/10675
This FEIS species review synthesizes information on the relationship of Artemisia campestris (field sagewort) 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
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

Sphaeralcea coccinea (scarlet globemallow)
www.nrfirescience.org/resource/10892
This FEIS species review synthesizes information on the relationship of Sphaeralcea coccinea (scarlet globemallow) 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): Jennifer E. Tollefson
Year Published: 2006
Type: Document
Synthesis

Rosa arkansana (prairie rose)
www.nrfirescience.org/resource/10699
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

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

Prunus pumila (sand cherry)
www.nrfirescience.org/resource/10868
This FEIS species review synthesizes information on the relationship of Prunus pumila (sand 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): Jane E. Taylor
Year Published: 2006
Type: Document
Synthesis

Juniperus horizontalis (creeping juniper)
www.nrfirescience.org/resource/10671
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

Carex filifolia (threadleaf sedge)
www.nrfirescience.org/resource/10696
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

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

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
Cercocarpus ledifolius (curlleaf mountain-mahogany)
www.nrfirescience.org/resource/10678
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

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

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

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

Artemisia norvegica (boreal sagebrush)
www.nrfirescience.org/resource/10865
This FEIS species review synthesizes information on the relationship of Artemisia norvegica (boreal 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): Jane E. Taylor**
**Year Published:** 2006
**Type:** Document
**Synthesis**

**Apocynum cannabinum (Indianhemp)**
www.nrfirescience.org/resource/10819

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**

**Restoration treatment effects on the understory of ponderosa pine/Douglas-fir forests in western Montana, USA**
www.nrfirescience.org/resource/7900

Fire exclusion and high-grade logging have altered the structure and function of ponderosa pine (Pinus ponderosa) forests across the American West. Restoration treatments are increasingly being used in these forests to move stand density, structure, and species composition toward more historically sustainable conditions. Yet little...

**Author(s): Kerry L. Metlen, Carl E. Fiedler**
**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**

**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**
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...
Author(s): Rachelle Meyer
Year Published: 2006
Type: Document
Synthesis

Ledum groenlandicum (bog Labrador tea)
www.nrfirescience.org/resource/10670
This FEIS species review synthesizes information on the relationship of Ledum groenlandicum (bog Labrador tea) 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

Fire management impacts on invasive plants in the western United States
www.nrfirescience.org/resource/12024
Fire management practices affect alien plant invasions in diverse ways. I considered the impact of six fire management practices on alien invasions: fire suppression, forest fuel reduction, prescription burning in crown-fire ecosystems, fuel breaks, targeting of noxious aliens, and postfire rehabilitation. Most western United States...
Author(s): Jon E. Keeley
Year Published: 2006
Type: Document
Book or Chapter or Journal Article, Synthesis

Gymnorhinus cyanocephalus (pinyon jay)
www.nrfirescience.org/resource/10904
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

Nitrogen spatial heterogeneity influences diversity following restoration in a ponderosa pine forest, Montana
www.nrfirescience.org/resource/7898
The resource heterogeneity hypothesis (RHH) is frequently cited in the ecological literature as an important mechanism for maintaining species diversity. The RHH has rarely been evaluated in the
context of restoration ecology in which a commonly cited goal is to restore diversity. In this study we focused on the spatial...

Author(s): Michael J. Gundale, Thomas H. DeLuca, Carl E. Fiedler, Kerry L. Metlen
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

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

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

Artemisia pedatifida (birdfoot sagebrush)
www.nrfirescience.org/resource/10864
This FEIS species review synthesizes information on the relationship of Artemisia pedatifida (birdfoot 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...

Author(s): Jane E. Taylor
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

Balsamorhiza hookeri (Hooker balsamroot)
www.nrfirescience.org/resource/10804
This FEIS species review synthesizes information on the relationship of Balsamorhiza hookeri (Hooker 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): Gregory T. Munger
Year Published: 2006
Type: Document
Synthesis
Complex interactions shaping aspen dynamics in the Greater Yellowstone Ecosystem
www.nrfirescience.org/resource/7906
Loss of aspen (Populus tremuloides) has generated concern for aspen persistence across much of the western United States. However, most studies of aspen change have been at local scales and our understanding of aspen dynamics at broader scales is limited. At local scales, aspen loss has been attributed to fire exclusion, ungulate...
Author(s): K. Brown, Andrew J. Hansen, Robert E. Keane, Lisa Graumlich
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Acer grandidentatum (bigtooth maple)
www.nrfirescience.org/resource/10895
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
Year Published: 2006
Type: Document
Synthesis

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

The influence of previous mountain pine beetle (Dendroctonus ponderosae) activity on the 1988 Yellowstone fires
www.nrfirescience.org/resource/13565
We examined the historical record of mountain pine beetle (Dendroctonus ponderosae Hopkins) activity within Yellowstone National Park, Wyoming, for the 25-years period leading up to the 1988 Yellowstone fires (1963-86) to determine how prior beetle activity and the resulting tree mortality affected the spatial pattern of the 1988...
Author(s): Heather J. Lynch, Roy A. Renkin, Robert Crabtree, Paul R. Moorcroft
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

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

Managing fire-prone forests in the Western United
www.nrfirescience.org/resource/16308
The management of fire-prone forests is one of the most controversial natural resource issues in the US today, particularly in the west of the country. Although vegetation and wildlife in these forests are adapted to fire, the historical range of fire frequency and severity was huge. When fire regimes are altered by human activity,...

Author(s): Reed F. Noss, Jerry F. Franklin, William L. Baker, Tania L. Schoennagel, Peter B. Moyle
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Frequent fire alters nitrogen transformations in ponderosa pine stands of the inland Northwest
www.nrfirescience.org/resource/7919
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

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
Fuels management programs are designed to reduce risks to communities and to improve and maintain ecosystem health. The International Association of Wildland Fire initiated the 1st Fire Behavior and Fuels Conference to address development, implementation, and evaluation of these programs. The focus was on how to measure success.

Author(s): Patricia L. Andrews, Bret W. Butler
Year Published: 2006
Type: Document
Conference Proceedings

Geum triflorum (prairie smoke)
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

Cercocarpus montanus (true mountain-mahogany)
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

Fire and restoration of sagebrush ecosystems
Wildlife managers often resort to prescribed fire to restore sagebrush (Artemisia spp.) ecosystems thought to have been affected by fire exclusion. However, a fire mosaic of burned and unburned areas may be tolerated by certain wildlife but can be detrimental to sagebrush obligates. This article assesses evidence about the...

Author(s): William L. Baker
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Distichlis spicata (saltgrass)
This FEIS species review synthesizes information on the relationship of Distichlis spicata (saltgrass) to fire--how fire affects the species and its habitat, effects of the species on fuels and fire regimes, and fire
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

Opuntia humifusa (eastern pricklypear)
www.nrfirescience.org/resource/10863
This FEIS species review synthesizes information on the relationship of Opuntia humifusa (eastern pricklypear) 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): Jane E. Taylor
Year Published: 2006
Type: Document
Synthesis

Impacts of restoration treatments on alien plant invasion in Pinus ponderosa forests, Montana, USA
www.nrfirescience.org/resource/7897
Invasion by alien plant species represents a challenge to land managers throughout the world as they attempt to restore frequent fire-adapted ecosystems following decades of fire exclusion. In ponderosa pine Pinus ponderosa forests of western North America, the response of alien species to restoration treatments has not been well...
Author(s): Erich K. Dodson, Carl E. Fiedler
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

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
Combustion properties of Bromus tectorum L.: influence of ecotype and growth under four CO2 concentrations

We grew from seed the exotic invasive annual grass Bromus tectorum L., collected from three elevation ecotypes in northern Nevada, USA. Plants were exposed to four CO2 atmosphere concentrations: 270, 320, 370, and 420 umol mol-1. After harvest on day 87, above-ground tissue was milled, conditioned to 30% relative humidity, and...

Author(s): Robert R. Blank, Robert H. White, Lewis H. Ziska
Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Root diseases in coniferous forests of the Inland Northwest: potential implications of fuels treatments

After nearly 100 years of fire exclusion, introduced pests, and selective harvesting, a change in forest composition has occurred in many Inland West forests of North America. This change in forest structure has frequently been accompanied by increases in root diseases and/or an unprecedented buildup of fuels. Consequently, many...

Author(s): Raini C. Rippy, Jane E. Stewart, Paul J. Zambino, Ned B. Klopfenstein, Joanne M. Tirocke, Mee-Sook Kim, Walter G. Thies
Year Published: 2005
Type: Document
Technical Report or White Paper

Fall-prescribed burn and spring-applied herbicide effects on Canada thistle control and soil seedbank in a northern mixed-grass prairie

Prescribed burning in Theodore Roosevelt National Park has played an important role in maintaining a natural ecosystem. However, changes in plant community dynamics caused by burning may have led to an invasion of weedy species such as Canada thistle (Cirsium arvense L.). The objectives of this research were to evaluate the effect...

Author(s): Andrea J. Travniecek, Rodney G. Lym, Chad Prosser
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Cornus nuttallii (Pacific dogwood)

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

Distribution of bark beetle attacks after whitebark pine restoration treatments: a case study
Whitebark pine (Pinus albicaulis Engelm.), an important component of high elevation ecosystems in the western United States and Canada, is declining due to fire exclusion, white pine blister rust (Cronartium ribicola J.C. Fisch.), and mountain pine beetle (Dendroctonus ponderosae Hopkins). This study was conducted to evaluate the...

Author(s): Kristen M. Waring, Diana L. Six
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Symphoricarpos longiflorus (longflower snowberry)

www.nrfirescience.org/resource/10790
This FEIS species review synthesizes information on the relationship of Symphoricarpos longiflorus (longflower 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): Jack McWilliams
Year Published: 2005
Type: Document
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

The role of fire in structuring sagebrush habitats and bird communities

www.nrfirescience.org/resource/15408
Fire is a dominant and highly visible disturbance in sagebrush (Artemisia spp.) ecosystems. In lower elevation, xeric sagebrush communities, the role of fire has changed in recent decades from an infrequent disturbance maintaining a landscape mosaic and facilitating community processes to frequent events that alter sagebrush...

Author(s): Steve Knick, Aaron L. Holmes, Richard F. Miller
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

www.nrfirescience.org/resource/11879
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
Artemisia dracunculus (tarragon)
www.nrfirescience.org/resource/10665
This FEIS species review synthesizes information on the relationship of Artemisia dracunculus (tarragon) 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): Amy H. Groen
Year Published: 2005
Type: Document
Synthesis

Carbon cycling at the landscape scale: the effect of changes in climate and fire frequency on age distribution, stand structure, and net ecosystem production - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11151
We are working in Yellowstone National Park to determine how initial post-fire structural heterogeneity controls carbon dynamics over the full cycle of individual forest stands, and how climate-mediated changes in the fire regime could potentially alter the behavior of the entire Yellowstone ecosystem as a net sink or net source in...
Author(s): Michael G. Ryan, Daniel M. Kashian, Erica A. H. Smithwick, William H. Romme, Monica G. Turner, Daniel B. Tinker
Year Published: 2005
Type: Document
Technical Report or White Paper

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

Elaeagnus angustifolia (Russian-olive)
www.nrfirescience.org/resource/10486
This FEIS species review synthesizes information on the relationship of Elaeagnus angustifolia (Russian-olive) 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: 2005
Type: Document
Synthesis
Psathyrostachys juncea (Russian wildrye)
www.nrfirescience.org/resource/10476
This FEIS species review synthesizes information on the relationship of Psathyrostachys juncea (Russian wildrye) 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): Jane E. Taylor
Year Published: 2005
Type: Document
Synthesis

Bouteloua barbata (sixweeks grama)
www.nrfirescience.org/resource/10703
This FEIS species review synthesizes information on the relationship of Bouteloua barbata (sixweeks grama) 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: 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

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

Restoring dry and moist forests of the inland northwestern U. S.
www.nrfirescience.org/resource/7903
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...
Cytisus scoparius, Cytisus striatus (Scotch broom, Portuguese broom)
www.nrfirescience.org/resource/10488
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...

Plant succession and approaches to community restoration
www.nrfirescience.org/resource/8418
The processes of vegetation change over time, or plant succession, are also the processes involved in plant community restoration. Restoration efforts attempt to use designed disturbance, seedbed preparation and sowing methods, and selection of adapted and compatible native plant materials to enhance ecological function. The large...

Leucopoa kingii (spike fescue)
www.nrfirescience.org/resource/10599
This FEIS species review synthesizes information on the relationship of Leucopoa kingii (spike fescue) 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...

Five-year operational trial of verbenone to deter mountain pine beetle (Dendroctonus ponderosae; Coleoptera: Scolytidae) attack of lodgepole pine (Pinus contorta)
www.nrfirescience.org/resource/11410
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...
Dalea purpurea (purple prairie clover)
www.nrfirescience.org/resource/10745
This FEIS species review synthesizes information on the relationship of Dalea purpurea (purple prairie clover) 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): Kevin R. League
Year Published: 2005
Type: Document
Synthesis

Juncus balticus (Baltic rush)
www.nrfirescience.org/resource/10701
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

Recent history of large-scale ecosystem disturbances in North America derived from the AVHRR satellite record
www.nrfirescience.org/resource/11506
Ecosystem structure and function are strongly affected by disturbance events, many of which in North America are associated with seasonal temperature extremes, wildfires, and tropical storms. This study was conducted to evaluate patterns in a 19-year record of global satellite observations of vegetation phenology from the advanced...
Author(s): Christopher Potter, Tan Ping-Ning, Vipin Kumar, Chris J. Kucharik, Steven Klooster, Vanessa Genovese, Warren B. Cohen, Sean P. Healey
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

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

Effects of prescribed fire on the invasion of northern mixed-grass prairie by non-native plant species - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/11162
We seek to measure the effects of fire and grazing on weeds of the northern mixed grass prairie. To accomplish this we are interpreting measurements from two management experiments, one at
Lostwood National Wildlife Refuge (NWR) and one at Des Lacs NWR. At Lostwood we found a nearly balanced 2x7 treatment experiment with seven...

Author(s): Jennifer S. Hartz-Rubin, Tad Weaver, Cory S. Rubin, Jack Plaggemeyer
Year Published: 2005
Type: Document
Technical Report or White Paper

Opuntia fragilis (brittle pricklypear)
www.nrfirescience.org/resource/10867
This FEIS species review synthesizes information on the relationship of Opuntia fragilis (brittle pricklypear) 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): Jane E. Taylor
Year Published: 2005
Type: Document
Synthesis

Calamovilfa longifolia (prairie sandreed)
www.nrfirescience.org/resource/10697
This FEIS species review synthesizes information on the relationship of Calamovilfa longifolia (prairie sandreed) 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: 2005
Type: Document
Synthesis

Yucca glauca (soapweed yucca)
www.nrfirescience.org/resource/10664
This FEIS species review synthesizes information on the relationship of Yucca glauca (soapweed yucca) 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): Amy H. Groen
Year Published: 2005
Type: Document
Synthesis

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)
www.nrfirescience.org/resource/10465
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
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

Asclepias speciosa (showy milkweed)

This FEIS species review synthesizes information on the relationship of Asclepias speciosa (showy milkweed) 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: 2005  
Type: Document  
Synthesis

Sagebrush steppe and pinyon-juniper ecosystems - effects of changing fire regimes, increased fuel loads, and invasive species - Final Report to the Joint Fire Science Program

Pinyon-juniper woodlands and Wyoming big sagebrush ecosystems have undergone major changes in vegetation structure and composition since settlement by European Americans. These changes are resulting in dramatic shifts in fire frequency, size and severity. Effective management of these systems has been hindered by lack of information...  
Year Published: 2005  
Type: Document  
Technical Report or White Paper

Hypericum perforatum (common St Johnswort)

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
Restoration treatments in a Montana ponderosa pine forest: effects on soil physical, chemical, and biological properties

www.nrfirescience.org/resource/7899

Low-elevation ponderosa pine ecosystems of the inland northwestern United States experienced frequent, low-severity fire that promoted open stands dominated by large diameter ponderosa pine (Pinus ponderosa). Fire exclusion has led to increased stand densities, often due to proliferation of less fire-tolerant species and an...

Author(s): Michael J. Gundale, Thomas H. DeLuca, Carl E. Fiedler, Philip W. Ramsey, Michael G. Harrington, James E. Gannon
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Monitoring changes in weed populations: post-fire and post-herbicide treatment

www.nrfirescience.org/resource/11040

Description not entered
Author(s): Elaine Kennedy Sutherland
Year Published: 2004
Type: Document
Conference Proceedings

Prunus pensylvanica (pin cherry)

www.nrfirescience.org/resource/10607

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

The influence of fire interval, on post-fire understorey communities in Yellowstone National Park (USA)

www.nrfirescience.org/resource/18427

Questions: How does the time interval between subsequent stand-replacing fire events affect post-fire understorey cover and composition following the recent event? How important is fire interval relative to broad- or local-scale environmental variability in structuring post-fire understorey communities?

Location: Subalpine plateaus...
Author(s): Tania L. Schoennagel, M. G. Waller, Monica G. Turner, William H. Romme
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

Sorghum halepense (Johnson grass)

www.nrfirescience.org/resource/10459

This FEIS species review synthesizes information on the relationship of Sorghum halepense (Johnson 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
Sonchus arvensis (perennial sowthistle)
www.nrfirescience.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

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

Monitoring change in exotic plant abundance after fuel reduction/restoration treatments in ponderosa pine forests of western Montana
www.nrfirescience.org/resource/11279
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 mensiezi) forests to compare response among treatments. Treatments included: no treatment (control), prescribed burning,...
Author(s): Erich K. Dodson
Year Published: 2004
Type: Document
Dissertation or Thesis

Sarcobatus vermiculatus (black greasewood)
www.nrfirescience.org/resource/10592
This FEIS species review synthesizes information on the relationship of Sarcobatus vermiculatus (black greasewood) 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: 2004
Type: Document
Synthesis

Asarum caudatum (wild ginger)
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

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...

Author(s): Michelle Nijhuis
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

How much do we know about the effects of wildfire on the occurrence and expansion of non-native plant species’ distributions in natural areas?

Invasion of non-native plant species into natural and managed ecosystems is a widespread problem, with potentially devastating ecological and economic consequences. Increased occurrence and severity of wildland fires has been identified as a potential threat to natural and managed ecosystems. Wildfire is often linked with the...

Author(s): Mara Johnson, Lisa J. Rew, Bruce D. Maxwell, Steve Sutherland
Year Published: 2004
Type: Document
Conference Proceedings, Synthesis

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

Convolvulus arvensis (field bindweed)

This FEIS species review synthesizes information on the relationship of Convolvulus arvensis (field bindweed) 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
Lepidium latifolium (perennial pepperweed)
www.nrfirescience.org/resource/10491
This FEIS species review synthesizes information on the relationship of Lepidium latifolium (perennial pepperweed) 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: 2004
Type: Document
Synthesis

Leymus salinus (Salina wildrye)
www.nrfirescience.org/resource/10602
This FEIS species review synthesizes information on the relationship of Leymus salinus (Salina 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: 2004
Type: Document
Synthesis

Cardaria chalapensis, Cardaria draba, Cardaria pubescens (lens-podded hoary cress, heart-podded hoary cress, globe-podded hoary cress)
www.nrfirescience.org/resource/10490
This FEIS species review synthesizes information on the relationship of Cardaria chalapensis, Cardaria draba, Cardaria pubescens (lens-podded hoary cress, heart-podded hoary cress, globe-podded hoary cress) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and fire...
Author(s): Kristin L. Zouhar
Year Published: 2004
Type: Document
Synthesis

Leymus ambiguus (Colorado wildrye)
www.nrfirescience.org/resource/10600
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

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

Forest entomology in Yellowstone National Park, 1923-1957: a time of discovery and learning to let live

For several decades after the creation of Yellowstone National Park in 1872, protection of its biological and other resources was haphazard. For example, elk and bison were exploited to near extinction, prompting aggressive protection of them, which included extermination of the native gray wolf from the park. In those...

Author(s): Malcolm M. Furniss, Roy A. Renkin
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Effects of prescribed fire and season of burn on recruitment of the invasive exotic plant, Potentilla recta, in a semiarid grassland

Prescribed fire is often used to restore grassland systems to presettlement conditions; however, fire also has the potential to facilitate the invasion of exotic plants. Managers of wildlands and nature reserves must decide whether and how to apply prescribed burning to the best advantage in the face of this dilemma. Herbicide is...

Author(s): Peter Lesica, B. Martin
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

The influence of fire interval and serotiny on postfire lodgepole pine density in Yellowstone National Park

The time interval between stand-replacing fires can influence patterns of initial postfire succession if the abundance of postfire propagules varies with prefire stand age. We examined the effect of fire interval on initial postfire lodgepole pine (Pinus contorta var. latifolia Engelm.) density in Yellowstone National Park (YNP)...

Author(s): Tania L. Schoennagel, Monica G. Turner, William H. Romme
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

Artemisia frigida (fringed sagebrush)

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,
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

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

Mapping the cheatgrass-caused departure from historical natural fire regimes in the Great Basin, USA

www.nrfirescience.org/resource/11490

Cheatgrass (Bromus tectorum) is an exotic grass that has increased fire hazard on millions of square kilometers of semi-arid rangelands in the western United States. Cheatgrass aggressively out competes native vegetation after fire and significantly enhances fire size and frequency. To evaluate the effect of cheatgrass on historical...

Author(s): James P. Menakis, Dianne Osborne, Melanie Miller
Year Published: 2003
Type: Document
Conference Proceedings

Schoenocrambe linifolia (flaxleaf plainsmustard)

www.nrfirescience.org/resource/10712

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,...

Author(s): Janet L. Howard
Year Published: 2003
Type: Document
Synthesis
Artemisia filifolia (sand sagebrush)
www.nrfirescience.org/resource/10787
This FEIS species review synthesizes information on the relationship of Artemisia filifolia (sand 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

Pinus contorta var. latifolia (Rocky Mountain lodgepole pine)
www.nrfirescience.org/resource/10597
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
Synthesis

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

On the impact of fire suppression and BAER restoration on weeds
www.nrfirescience.org/resource/11043
In 2000, wildfires burned more than 200,000 acres on the Bitterroot National Forest of Montana and nearly 1.5 million acres in the Northern and Intermountain Regions. Management activities associated with fire suppression and post-fire restoration have had the unintentional consequence of promoting invasive weeds. As part of fire...
Author(s): Elaine Kennedy Sutherland
Year Published: 2003
Type: Document
Conference Proceedings

Prescribed fire effects on dalmation toadflax
www.nrfirescience.org/resource/8281
Prescribed fires are important for rangeland restoration and affect plant community composition and species interactions. Many rangeland plant communities have been, or are under the threat of noxious weed invasion, however there is little information on how fire effects weeds. Our objective was to
determine the effects of...
Author(s): James S. Jacobs, Roger L. Sheley
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

**Bouteloua gracilis (blue grama)**
[www.nrfirescience.org/resource/10604](www.nrfirescience.org/resource/10604)
This FEIS species review synthesizes information on the relationship of Bouteloua gracilis (blue grama) 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: 2003
Type: Document
Synthesis

**Pinus ponderosa var. scopulorum (interior ponderosa pine)**
[www.nrfirescience.org/resource/10718](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

**The role of wildland fire and subsequent insect attack on ponderosa pine mortality**
[www.nrfirescience.org/resource/10990](www.nrfirescience.org/resource/10990)
Survival of ponderosa pine following wildfire events depends on a number of factors, including the level of injury to the tree from the fire and the environmental conditions following the fire. The unprecedented fire year of 2000 provided an opportunity to quantify cumulative impacts of wildland fires and subsequent insect attack on...
Author(s): Joel D. McMillin, Linda L. Wadleigh, Carolyn Hull Sieg, Jose F. Negron, Ken E. Gibson, Kurt K. Allen, John A. Anhold
Year Published: 2003
Type: Document
Conference Proceedings

**Sisymbrium altissimum (tumble mustard)**
[www.nrfirescience.org/resource/10458](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
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

Tamarix chinensis, Tamarix gallica, Tamarix parviflora, Tamarix ramosissima (tamarisk, French tamarisk, small-flowered tamarisk, saltcedar)
www.nrfirescience.org/resource/10485
This FEIS species review synthesizes information on the relationship of Tamarix chinensis, Tamarix gallica, Tamarix parviflora, Tamarix ramosissima (tamarisk, French tamarisk, small-flowered tamarisk, saltcedar) to fire--how fire affects the species and its habitat, invasiveness of the species, effects of the species on fuels and...
Author(s): Kristin L. Zouhar
Year Published: 2003
Type: Document
Synthesis

Acer platanoides (Norway maple)
www.nrfirescience.org/resource/10466
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

Wildfire and weeds in the Northern Rockies
www.nrfirescience.org/resource/8414
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

Picrothamnus desertorum (budsage)
www.nrfirescience.org/resource/10791
This FEIS species review synthesizes information on the relationship of Picrothamnus desertorum (budsage) 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,
Bromus tectorum (cheatgrass)
www.nrfirescience.org/resource/10495
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
Synthesis

Artemisia rigida (stiff sagebrush)
www.nrfirescience.org/resource/10785
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

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

Atriplex canescens (fourwing saltbush)
www.nrfirescience.org/resource/10727
This FEIS species review synthesizes information on the relationship of Atriplex canescens (fourwing saltbush) 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. Howard
Year Published: 2003
Type: Document
Synthesis
Artemisia arbuscula (low sagebrush)
www.nrfirescience.org/resource/10854
This FEIS species review synthesizes information on the relationship of Artemisia arbuscula (low 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): Peter D. Steinberg
Year Published: 2002
Type: Document
Synthesis

Tetradymia nuttallii (Nuttall's horsebrush)
www.nrfirescience.org/resource/10734
This FEIS species review synthesizes information on the relationship of Tetradymia nuttallii (Nuttall's 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...
Author(s): Janet L. Howard
Year Published: 2002
Type: Document
Synthesis

Centaurea solstitialis (yellow starthistle)
www.nrfirescience.org/resource/10484
This FEIS species review synthesizes information on the relationship of Centaurea solstitialis (yellow starthistle) 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: 2002
Type: Document
Synthesis

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

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,
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 species' taxonomy,...

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...

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,...

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...
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

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

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,...
Author(s): Kristin L. Zouhar
Year Published: 2002
Type: Document
Synthesis

Pinus albicaulis (whitebark pine)
www.nrfirescience.org/resource/10651
This FEIS species review synthesizes information on the relationship of Pinus albicaulis (whitebark 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): Janet L. Fryer
Year Published: 2002
Type: Document
Synthesis

Tetradymia glabrata (littleleaf horsebrush)
www.nrfirescience.org/resource/10735
This FEIS species review synthesizes information on the relationship of Tetradymia glabrata (littleleaf 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...
Author(s): Janet L. Howard
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

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

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

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...
Author(s): Janette S. Scher
Year Published: 2002
Type: Document
Synthesis

Pinus edulis (Colorado pinyon)
www.nrfirescience.org/resource/10598
This FEIS species review synthesizes information on the relationship of Pinus edulis (Colorado pinyon) 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

Tetradymia spinosa (spiny horsebrush)
www.nrfirescience.org/resource/10733
This FEIS species review synthesizes information on the relationship of Tetradymia spinosa (spiny 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): Janet L. Howard
Year Published: 2002
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

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

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
**Populus balsamifera subsp. trichocarpa (black cottonwood)**

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

**Can the fire-dependent whitebark pine be saved?**

In recent decades, whitebark pine has been declining due to epidemics and fire exclusion (Keane and Arno 1993; Kendall and Arno 1990). In the northern Rocky Mountains, a project is underway to explore the feasibility of using fire and silviculture to restore the tree's high-elevation habitat.

Author(s): Robert E. Keane
Year Published: 2001
Type: Document

**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

**Atriplex confertifolia (shadscale)**

This FEIS species review synthesizes information on the relationship of Atriplex confertifolia (shadscale) 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): Kevin A. Simonin
Year Published: 2001
Type: Document

**Ephedra viridis (green ephedra)**

This FEIS species review synthesizes information on the relationship of Ephedra viridis (green ephedra) 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,
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

Centaurea maculosa (spotted knapweed)
www.nrfirescience.org/resource/10493
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

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

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
Acroptilon repens (Russian knapweed)
www.nrfirescience.org/resource/10496
This FEIS species review synthesizes information on the relationship of Acroptilon repens (Russian 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

Whitebark pine communities: ecology and restoration
www.nrfirescience.org/resource/16422
Whitebark pine is a dominant feature of western high-mountain regions, offering an important source of food and high-quality habitat for species ranging from Clark's nutcracker to the grizzly bear. But in the northwestern United States and southwestern Canada, much of the whitebark pine is disappearing. Why is a high-mountain...
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Climate change and forest disturbances
www.nrfirescience.org/resource/13399
This article examines how eight disturbances influence forest structure, composition, and function, and how climate change may influence the severity, frequency, and magnitude of disturbances to forests. We focus on examples from the United States, although these influences occur worldwide. We also consider options for coping with...
Author(s): Virginia H. Dale, Linda A. Joyce, Ronald P. Neilson, Steven G. McNulty, Matthew P. Ayres, Michael D. Flannigan, Paul J. Hanson, Lloyd C. Irland, Ariel L. Lugo, Chris J. Peterson, Daniel Simberloff, Frederick J. Swanson, Brian J. Stocks, B. Mike Wotton
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Elymus elymoides (bottlebrush squirreltail)
www.nrfirescience.org/resource/10834
This FEIS species review synthesizes information on the relationship of Elymus elymoides (bottlebrush squirreltail) 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

Taeniatherum caput-medusae (medusahead)
www.nrfirescience.org/resource/10447
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'...
Educational program about wildland fire integrates plant science into curriculum
www.nrfirescience.org/resource/8386
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...

Cirsium arvense (Canada thistle)
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....

Delayed seed germination in whitebark pine and regeneration patterns following the Yellowstone fires
www.nrfirescience.org/resource/8185
Whitebark pine (Pinus albicaulis) seeds are dispersed by Clark's Nutcracker (Nucifraga columbiana), a bird that makes caches under 2-3 cm of soil. Cached seeds may delay germination for one or more years in part because of underdeveloped embryos at the time of seed dispersal. Consequently, whitebark pine may show a soil seed bank...

Populus deltoides, Populus deltoides var. deltoides, Populus deltoides var. mislizeni, Populus deltoides var. monilifera (eastern cottonwood, eastern cottonwood, Rio Grande cottonwood, plains cottonwood)
www.nrfirescience.org/resource/10862
This FEIS species review synthesizes information on the relationship of Populus deltoides, Populus deltoides var. deltoides, Populus deltoides var. mislizeni, Populus deltoides var. monilifera (eastern cottonwood, eastern cottonwood, Rio Grande cottonwood, plains cottonwood) to fire--how fire affects the species and its habitat,...


Salix scouleriana (Scouler willow)
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

Sporobolus airoides (alkali sacaton)
www.nrfirescience.org/resource/10744
This FEIS species review synthesizes information on the relationship of Sporobolus airoides (alkali sacaton) 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): Kathleen A. Johnson
Year Published: 2001
Type: Document
Synthesis

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

Bromus madritensis, Bromus rubens (foxtail chess, red brome)
www.nrfirescience.org/resource/10469
This FEIS species review synthesizes information on the relationship of Bromus madritensis, Bromus rubens (foxtail chess, red brome) 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...
Author(s): Kevin A. Simonin
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

The relative importance of fire and watercourse proximity in determining stand composition in mixed conifer riparian forests
www.nrfirescience.org/resource/18653
Factors related to the composition of riparian forest stands on three streams in the northern Sierra Nevada mixed conifer forest type were related to proximity to the water course and years since fire. Using a linear regression analysis 46 variables were correlated to the natural log of distance from the thalweg “ln(distance)”...
Author(s): William H. Russell, Joe R. McBride
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

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

Aspen's ecological role in the West
www.nrfirescience.org/resource/11883
Aspen exhibits a variety of ecological roles. In southern Colorado, the 1880 landscape mosaic contained a range of stand ages, of which half were >70 years old and half were younger. Pure aspen stands in southern Colorado are widespread and may result from previous short fire intervals that eliminated local conifer seed sources....
Author(s): William H. Romme, Lisa Floyd-Hanna, David D. Hanna, Elisabeth Bartlett
Year Published: 2001
Type: Document
Conference Proceedings

Acer glabrum (Rocky Mountain maple)
www.nrfirescience.org/resource/10609
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
Strategies for managing whitebark pine in the presence of white pine blister rust
www.nrfirescience.org/resource/7902
Description not entered
Author(s): Raymond J. Hoff, Dennis E. Ferguson, Geral I. McDonald, Robert E. Keane
Year Published: 2001
Type: Document
Book or Chapter or Journal Article, Synthesis

The role of postfire coarse woody debris in aspen regeneration
www.nrfirescience.org/resource/18643
The paucity of aspen (Populus tremuloides) regeneration in the western United States and on Yellowstone National Park’s (YNP) northern range has been of concern to managers and scientists for much of the 20th century, with the effects of ungulate browsing, climate fluctuation, and fire suppression being vigorously debated. We...
Author(s): William J. Ripple, Eric J. Larsen
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Post-fire runoff and erosion from rainfall simulation: contrasting forests with shrublands and grasslands
www.nrfirescience.org/resource/18566
Rainfall simulations allow for controlled comparisons of runoff and erosion among ecosystems and land cover conditions. Runoff and erosion can increase greatly following fire, yet there are few rainfall simulation studies for post-fire plots, particularly after severe fire in semiarid forest. We conducted rainfall simulations...
Author(s): Matthew P. Johansen, Thomas E. Hakonson, David D. Breshears
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Pinus monophylla (singleleaf pinyon)
www.nrfirescience.org/resource/10935
This FEIS species review synthesizes information on the relationship of Pinus monophylla (singleleaf pinyon) 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: 2001
Type: Document
Synthesis

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
Danthonia spicata (poverty oatgrass)
www.nrfirescience.org/resource/10620
This FEIS species review synthesizes information on the relationship of Danthonia spicata (poverty 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): Daniel Covington
Year Published: 2000
Type: Document
Synthesis

Pleuraphis jamesii (galleta)
www.nrfirescience.org/resource/10833
This FEIS species review synthesizes information on the relationship of Pleuraphis jamesii (galleta) 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): Kevin A. Simonin
Year Published: 2000
Type: Document
Synthesis

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

Fallugia paradoxa (Apache plume)
www.nrfirescience.org/resource/10786
This FEIS species review synthesizes information on the relationship of Fallugia paradoxa (Apache plume) 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): Jack McWilliams
Year Published: 2000
Type: Document
Synthesis

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

Restoration of whitebark pine ecosystems in western Montana and central Idaho
www.nrfirescience.org/resource/19232
No description available
Author(s): Robert E. Keane, Stephen F. Arno
Year Published: 2000
Type: Document
Conference Proceedings

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

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

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
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

Disturbance regimes of stream and riparian systems — a disturbance?cascade perspective

www.nrfirescience.org/resource/18615
Geomorphological processes that commonly transport soil down hillslopes and sediment and woody debris through stream systems in steep, mountainous, forest landscapes can operate in sequence down gravitational flowpaths, forming a cascade of disturbance processes that alters stream and riparian ecosystems. The affected stream and...
Author(s): Futoshi Nakamura, Frederick J. Swanson, Steven M. Wondzell
Year Published: 2000
Type: Document
Book or Chapter or Journal Article

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

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

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

Synthesis

Protecting people and sustaining resources in fire-adapted ecosystems: a cohesive strategy
www.nrfirescience.org/resource/11223
This strategy is based on the premise that sustainable resources are predicated on healthy, resilient ecosystems. In fire-adapted ecosystems, some measure of fire use--at appropriate intensity, frequency, and time of year--should be included in management strategies intended to protect and sustain watersheds, species, and other...

Author(s): Lyle Laverty, Gerald W. Williams
Year Published: 2000
Type: Document

Technical Report or White Paper

Quercus gambelii (Gambel oak)
www.nrfirescience.org/resource/10835
This FEIS species review synthesizes information on the relationship of Quercus gambelii (Gambel oak) 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): Kevin A. Simonin
Year Published: 2000
Type: Document

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

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
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
Conference Proceedings

Miller Creek: ecosystem recovery in a western Montana forest 30 years after prescribed burning and wildfire
www.nrfirescience.org/resource/18682
Thirty years ago the effects of timber harvest, prescribed burning, and wildfire were investigated in a western larch/Douglas-fir forest on the Flathead National Forest in western Montana. The original study was designed to investigate the effects of prescribed burning on soil physical and biological properties, and on subsequent...
Author(s): Jonalea R. Tonn, Martin F. Jurgensen, G. D. Mroz, Deborah S. Page-Dumroese
Year Published: 2000
Type: Document
Conference Proceedings

Achnatherum thurberiana (Thurber needlegrass)
www.nrfirescience.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
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

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
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 can be... 
Author(s): Kevin A. Simonin 
Year Published: 2000 
Type: Document 
Synthesis

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

Elymus canadensis (Canada wildrye)
www.nrfirescience.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 
Synthesis

Juniperus osteosperma (Utah juniper)
www.nrfirescience.org/resource/10586
This FEIS species review synthesizes information on the relationship of Juniperus osteosperma (Utah juniper) 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): Elena Zlatnik 
Year Published: 1999 
Type: Document 
Synthesis
Gutierrezia sarothrae (broom snakeweed)
www.nrfirescience.org/resource/10880
This FEIS species review synthesizes information on the relationship of Gutierrezia sarothrae (broom snakeweed) 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

Hesperostipa comata (needle-and-thread grass)
www.nrfirescience.org/resource/10587
This FEIS species review synthesizes information on the relationship of Hesperostipa comata (needle-and-thread 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...
Author(s): Elena Zlatnik
Year Published: 1999
Type: Document
Synthesis

Artemisia tridentata subsp. wyomingensis (Wyoming big sagebrush)
www.nrfirescience.org/resource/10738
This FEIS species review synthesizes information on the relationship of Artemisia tridentata subsp. wyomingensis (Wyoming big sagebrush) 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...
Author(s): Janet L. Howard
Year Published: 1999
Type: Document
Synthesis

Achillea millefolium (western yarrow)
www.nrfirescience.org/resource/10591
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...
Author(s): Keith Aleksoff
Year Published: 1999
Type: Document
Synthesis

Bouteloua hirsuta (hairy grama)
www.nrfirescience.org/resource/10583
This FEIS species review synthesizes information on the relationship of Bouteloua hirsuta (hairy grama) 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): Elena Zlatnik
**Grayia spinosa (spiny hopsage)**
[www.nrfirescience.org/resource/10879](www.nrfirescience.org/resource/10879)
This FEIS species review synthesizes information on the relationship of Grayia spinosa (spiny hopsage) 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: 1999
Type: Document
Synthesis

**Muhlenbergia richardsonis (mat muhly)**
[www.nrfirescience.org/resource/10589](www.nrfirescience.org/resource/10589)
This FEIS species review synthesizes information on the relationship of Muhlenbergia richardsonis (mat 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...
Author(s): Keith Aleksoff
Year Published: 1999
Type: Document
Synthesis

**The budgetary, ecological, and managerial impacts of pinyon-juniper and cheatgrass fires**
[www.nrfirescience.org/resource/12108](www.nrfirescience.org/resource/12108)
The 1996 fire season illustrated the potential impacts of wildland fires on the Bureau of Land Management (BLM) administered lands through numerous western states. During the 1996 fire season, over six million acres burned in the United States through unplanned ignitions (wildfires). Over two million acres burned on BLM administered...
Author(s): Thomas C. Roberts
Year Published: 1999
Type: Document
Conference Proceedings

**Artemisia tridentata subsp. tridentata (basin big sagebrush)**
[www.nrfirescience.org/resource/10886](www.nrfirescience.org/resource/10886)
This FEIS species review synthesizes information on the relationship of Artemisia tridentata subsp. tridentata (basin big sagebrush) 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....
Author(s): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

**Prescribed fire effects on herpetofauna: review and management implications**
[www.nrfirescience.org/resource/18650](www.nrfirescience.org/resource/18650)
Prescribed burning is used to achieve a variety of silvicultural objectives, including controlling heavy fuel accumulation, exposing mineral soil, releasing available nutrients for seedbed preparation, and controlling certain insects, diseases, and competing vegetation (Hunter 1990, Pyne et al. 1996). Prescribed burning also is an...

Artemisia tripartita subsp. rupicola, Artemisia tripartita subsp. tripartita (Wyoming threetip sagebrush, tall threetip sagebrush)
www.nrfirescience.org/resource/10887
This FEIS species review synthesizes information on the relationship of Artemisia tripartita subsp. rupicola, Artemisia tripartita subsp. tripartita (Wyoming threetip sagebrush, tall threetip sagebrush) to fire--how fire affects the species and its habitat, and fire management considerations. Information is also provided on the...
Author(s): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

White pine in the American West: a vanishing species - can we save it?
www.nrfirescience.org/resource/13112
Forest scientists ask that everyone, from the home gardener to the forest manager, help revive western white pine by planting it everywhere, even in nonforest environments such as our neighborhood streets, parks, and backyards. White pine, long ago considered the "King Pine," once dominated the moist inland forests of the Northwest...
Author(s): Leon F. Neuenschwander, James W. Byler, Alan E. Harvey, Geral I. McDonald, Denise S. Ortiz, Harold L. Osborne, Gerry C. Snyder, Arthur Zack
Year Published: 1999
Type: Document
Technical Report or White Paper

Purshia tridentata (antelope bitterbrush)
www.nrfirescience.org/resource/10584
This FEIS species review synthesizes information on the relationship of Purshia tridentata (antelope bitterbrush) 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): Elena Zlatnik
Year Published: 1999
Type: Document
Synthesis

Bromus tectorum expansion and biodiversity loss on the Snake River Plain, southern Idaho, U.S.A.
www.nrfirescience.org/resource/11420
The Snake River Plain forms a 6 million ha arc-shaped depression across southern Idaho. Basalt flows, fresh water sediments, loess and volcanic deposits cover its surface. Elevation increases eastward from 650 to 2,150 m altitude. Climate is semi-arid with annual precipitation ranging from 150 to 400 mm, arriving primarily in winter...
Ecology and management of pinyon-juniper communities within the Interior West: Overview of the "Ecological Session" of the Symposium

www.nrfirescience.org/resource/11885

Categories of papers in the "Ecological Session" were history and ecological change, distribution, classification, ecology, and physiology, succession and diversity, and disease. Substantial changes have taken place in pinyon-juniper woodlands over the past 150 years. Coinciding with and following early extensive localized...

Prefire heterogeneity, fire severity, and early postfire plant reestablishment in subalpine forests of Yellowstone National Park, Wyoming

www.nrfirescience.org/resource/8212

The 1988 fires in Yellowstone National Park provided an opportunity to study effects of a large infrequent disturbance on a natural community. This study addressed two questions: (1) How does prefire heterogeneity of the landscape affect postfire patterns of fire severity? and (2) How do postfire patterns of burn severity influence...

Chrysothamnus viscidiflorus (green rabbitbrush)

www.nrfirescience.org/resource/10884

This FEIS species review synthesizes information on the relationship of Chrysothamnus viscidiflorus (green 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...

Yellowstone fires: a decade later

www.nrfirescience.org/resource/18476

Atop a ridge in Yellowstone National Park in 1984, a freak summer wind—perhaps a tornado or a downburst from a thunderstorm—leveled an ancient lodge-pole pine forest, piling up a head-high maze of logs. In the notorious summer of 1988, when wildfires burned one-third of the park, a fire front swept across the same ridge,...
Amelanchier utahensis (Utah serviceberry)
www.nrfirescience.org/resource/10588
This FEIS species review synthesizes information on the relationship of Amelanchier utahensis (Utah 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 review...
Author(s): Elena Zlatnik
Year Published: 1999
Type: Document
Synthesis

Juniperus occidentalis (western juniper)
www.nrfirescience.org/resource/10878
This FEIS species review synthesizes information on the relationship of Juniperus occidentalis (western juniper) 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): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

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

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

Prescribed fire effects on biological control of leafy spurge
www.nrfirescience.org/resource/8282
The flea beetle, Aphthona nigriscutis Foudras, is a potentially useful agent for biological control of leafy spurge (Euphorbia esula L.) in grasslands devoted to wildlife conservation. However, effects of other grassland management practices on the persistence and dynamics of flea beetle populations are not well understood. We...
Symphoricarpos oreophilus (mountain snowberry)
www.nrfirescience.org/resource/10590
This FEIS species review synthesizes information on the relationship of Symphoricarps oreophilus (mountain 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...

Pascopyrum smithii (western wheatgrass)
www.nrfirescience.org/resource/10877
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...

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...

Birds in a sagebrush sea: Managing sagebrush habitat for bird communities
www.nrfirescience.org/resource/15329
This booklet presents land management recommendations to help bird communities in sagebrush habitats. It was prepared for the Western Working Group of Partners in Flight, a partnership of private citizens, industry groups, government agencies, universities, nongovernment organizations, and others interested in bird conservation. Why...

Western national forests: a cohesive strategy is needed to address catastrophic wildfire threats
National forests of the dry, interior portion of the western United States that are managed by the Department of Agriculture's Forest Service have undergone significant changes over the last century and a half, becoming much denser, with fewer large trees and many more small, tightly spaced trees and underbrush. These changes have...

Author(s): United States General Accounting Office
Year Published: 1999
Type: Document
Technical Report or White Paper

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

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

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

Transitions and thresholds: influences and implications for management in pinyon and juniper woodlands

Thresholds are important to understanding Great Basin ecology. Once a threshold has been crossed, the new community may have very different functional capabilities than the previous community. Management action needs to occur well before a threshold is crossed to be effective, and that action needs to reflect the scales of time and...

Author(s): Robin J. Tausch
Year Published: 1999
Type: Document
Conference Proceedings

Achnatheruum hymenoides (Indian ricegrass)

This FEIS species review synthesizes information on the relationship of Achnatheruum hymenoides (Indian ricegrass) 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): D. A. Tirmenstein
Year Published: 1999
Type: Document
Synthesis

Elymus glaucus (blue wildrye)

This FEIS species review synthesizes information on the relationship of Elymus glaucus (blue 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 used...
Bromus hordeaceus (soft chess)
www.nrfirescience.org/resource/10461
This FEIS species review synthesizes information on the relationship of Bromus hordeaceus (soft chess) 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.

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...

Poa arida (plains bluegrass)
www.nrfirescience.org/resource/10715
This FEIS species review synthesizes information on the relationship of Poa arida (plains 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 used...

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...

Plant species richness and composition following the 1988 Yellowstone fires
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 development of boreal riparian plant communities after flooding, fire, and logging, Peace River, Canada

In this study vegetation development is compared and contrasted following natural and logging disturbances in a major boreal river valley in Alberta. Permanent sample plots and relevés were established and sampled for vegetation and landscape attributes in the Peace River Lowlands, Wood Buffalo National Park (now a UNESCO World...

Author(s): Kevin P. Timoney, George Peterson, Ross W. Wein
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Fire ecology of the forest habitat types of northern Idaho

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

Poa fendleriana (Fendler bluegrass)

This FEIS species review synthesizes information on the relationship of Poa fendleriana (Fendler 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)

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
Fire and fish: issues of forest health and conservation of sensitive species

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

Author(s): Bruce E. Rieman, James L. Clayton
Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Ambystoma macrodactylum (long-toed salamander)

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

Poa secunda (Sandberg bluegrass)

This FEIS species review synthesizes information on the relationship of Poa secunda (Sandberg 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

Poa cusickii (Cusick's bluegrass)

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

Aristida purpurea (purple threeawn)

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...
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
Synthesis

**Microtus pennsylvanicus (meadow vole)**

www.nrfirescience.org/resource/10514

This FEIS species review synthesizes information on the relationship of Microtus pennsylvanicus (meadow vole) 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: 1996
Type: Document
Synthesis

**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
Book or Chapter or Journal Article

**Whitebark pine ecosystem restoration in western Montana**

www.nrfirescience.org/resource/11251

From the Background..."A rapid decline in whitebark pine has occurred during the last 60 years as a result of three interrelated factors: epidemics of mountain pine beetle (Dendroctonus ponderosae); the introduced disease white pine blister rust (Cronartium ribicola); and successional replacement by shade-tolerant conifers,...

Author(s): Robert E. Keane, Stephen F. Arno
Year Published: 1996
Type: Document
Book or Chapter or Journal Article

**Perognathus parvus (Great Basin pocket mouse)**

www.nrfirescience.org/resource/10719

This FEIS species review synthesizes information on the relationship of Perognathus parvus (Great Basin pocket 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...

Author(s): Janet L. Howard
Year Published: 1996
Type: Document
Synthesis

**Urocyon cinereoargenteus (common gray fox)**
[www.nrfirescience.org/resource/10506](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 ecological implications of fire in Greater Yellowstone, proceedings of the second biennial conference on the Greater Yellowstone Ecosystem**
[www.nrfirescience.org/resource/11989](www.nrfirescience.org/resource/11989)
Proceedings of the second biennial conference on the Greater Yellowstone Ecosystem.
   Author(s): Jason Greenlee
   Year Published: 1996
   Type: Document
   Conference Proceedings

**Scophiopus intermontanus (Great Basin spadefoot)**
[www.nrfirescience.org/resource/10713](www.nrfirescience.org/resource/10713)
This FEIS species review synthesizes information on the relationship of Scophiopus intermontanus (Great Basin spadefoot) 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: 1996
   Type: Document
   Synthesis

**Spermophilus townsendii (Townsend’s ground squirrel)**
[www.nrfirescience.org/resource/10711](www.nrfirescience.org/resource/10711)
This FEIS species review synthesizes information on the relationship of Spermophilus townsendii (Townsend's ground 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...
   Author(s): Janet L. Howard
   Year Published: 1996
   Type: Document
   Synthesis

**Populus tremuloides (quaking aspen)**
[www.nrfirescience.org/resource/10717](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...
**Taxidea taxus (American badger)**

This FEIS species review synthesizes information on the relationship of Taxidea taxus (American badger) 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...

**Stand hazard rating for central Idaho forests**

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...

**Mustela vison (American mink)**

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...

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

Seral, fire dependent lodgepole pine (Pinus contorta Dougl.) communities are an important component of upper elevation forests throughout the Northern Rockies, where they cover 4 million acres, or about 17 percent of the land base. On the Bitterroot National Forest, lodgepole pine occurs mostly between 5,500 and 7,500 feet.
Athene cunicularia (burrowing owl)
www.nrfirescience.org/resource/10726
This FEIS species review synthesizes information on the relationship of Athene cunicularia (burrowing 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...
Author(s): Janet L. Howard
Year Published: 1996
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

Ribes lacustre (bristly black currant)
www.nrfirescience.org/resource/10752
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...
Author(s): Anna Marshall
Year Published: 1995
Type: Document
Synthesis

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...
Author(s): Jennifer H. Carey
Year Published: 1995
Type: Document
Synthesis

Ribes montigenum (gooseberry currant)
www.nrfirescience.org/resource/10751
This FEIS species review synthesizes information on the relationship of Ribes montigenum (gooseberry 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...
Antilocapra americana (pronghorn)

This FEIS species review synthesizes information on the relationship of Antilocapra americana (pronghorn) 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...

Dipodomys ordii (Ord's kangaroo rat)

This FEIS species review synthesizes information on the relationship of Dipodomys ordii (Ord's kangaroo rat) 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...

Urtica dioica (stinging nettle)

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...

Sialia mexicana (western bluebird)

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...

Puma concolor (mountain lion)
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 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: 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

Dichanthelium acuminatum (woolly panicum)

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 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...

Author(s): Jennifer H. Carey
Year Published: 1995
Type: Document
Synthesis

Festuca rubra (red fescue)

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
Buteo lagopus (rough-legged hawk)
www.nrfirescience.org/resource/10517
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

Poecile atricapillus (black-capped chickadee)
www.nrfirescience.org/resource/10511
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
Type: Document
Synthesis

Procyon lotor (northern raccoon)
www.nrfirescience.org/resource/10533
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

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

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 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

Bos bison (American bison)
www.nrfirescience.org/resource/10549
This FEIS species review synthesizes information on the relationship of Bos bison (American bison) 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: 1995
Type: Document
Synthesis

Krascheninnikovia lanata (winterfat)
www.nrfirescience.org/resource/10614
This FEIS species review synthesizes information on the relationship of Krascheninnikovia lanata (winterfat) 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
Type: Document
Synthesis

Sylvilagus floridanus (eastern cottontail)
www.nrfirescience.org/resource/10508
This FEIS species review synthesizes information on the relationship of Sylvilagus floridanus (eastern cottontail) 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: 1995
Type: Document
Synthesis
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 for...
Author(s): Anna Marshall
Year Published: 1995
Type: Document
Synthesis

Shepherdia argentea (silver buffaloberry)
www.nrfirescience.org/resource/10634
This FEIS species review synthesizes information on the relationship of Shepherdia argentea (silver 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): Lora L. Esser
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

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

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
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...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Schedonorus arundinaceus (tall fescue)
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

Restoration of upper subalpine whitebark pine ecosystems in western Montana
www.nrfirescience.org/resource/19233
Description not available
Author(s): Robert E. Keane, Stephen F. Arno, Catherine A. Stewart
Year Published: 1995
Type: Document
Conference Proceedings

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...
Author(s): Roberta A. Walsh
Year Published: 1995
Type: Document
Synthesis

Canis latrans (coyote)
www.nrfirescience.org/resource/10548
This FEIS species review synthesizes information on the relationship of Canis latrans (coyote) to
Deschampsia cespitosa (tufted hairgrass)
www.nrfirescience.org/resource/10913
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 can be...
Author(s): Roberta A. Walsh
Year Published: 1995
Type: Document
Synthesis

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

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...
Author(s): Janet Sullivan
Year Published: 1995
Type: Document
Synthesis

Ribes velutinum (desert gooseberry)
www.nrfirescience.org/resource/10750
This FEIS species review synthesizes information on the relationship of Ribes velutinum (desert 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): Anna Marshall
Year Published: 1995
Type: Document
Synthesis
Phasianus colchicus (ring-necked pheasant)
www.nrfirescience.org/resource/10535
This FEIS species review synthesizes information on the relationship of Phasianus colchicus (ring-necked pheasant) 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): Julie L. Tesky
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

Festuca subulata (bearded fescue)
www.nrfirescience.org/resource/10644
This FEIS species review synthesizes information on the relationship of Festuca subulata (bearded 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): 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

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
Agrostis exarata (spike bentgrass)
www.nrfirescience.org/resource/10641
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

Glycyrrhiza lepidota (wild licorice)
www.nrfirescience.org/resource/10631
This FEIS species review synthesizes information on the relationship of Glycyrrhiza lepidota (wild licorice) 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
Buteo regalis (ferruginous hawk)
www.nrfirescience.org/resource/10545
This FEIS species review synthesizes information on the relationship of Buteo regalis (ferruginous 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
Type: Document
Synthesis

Proceedings-ecology and management of annual rangelands; 1992 May 18-21; Boise, ID
www.nrfirescience.org/resource/12046
Annual weeds continue to expand throughout the West eliminating many desirable species and plant communities. Wildfires are now common on lands infested with annual weeds, causing a loss of wildlife habitat and other natural resources. Measures can be used to reduce burning and restore native plant communities, but restoration is...
Author(s): Stephen B. Monsen, Stanley G. Kitchen
Year Published: 1994
Type: Document
Conference Proceedings, Technical Report or White Paper

Buteo swainsoni (Swainson’s hawk)
www.nrfirescience.org/resource/10546
This FEIS species review synthesizes information on the relationship of Buteo swainsoni (Swainson’s 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
Type: Document
Synthesis

Alectoris chukar (chukar)
www.nrfirescience.org/resource/10860
This FEIS species review synthesizes information on the relationship of Alectoris chukar (chukar) 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

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
Ratibida columnifera (upright prairie coneflower)  
www.nrfirescience.org/resource/10911  
This FEIS species review synthesizes information on the relationship of Ratibida columnifera (upright prairie coneflower) 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): Roberta A. Walsh  
Year Published: 1994  
Type: Document  
Synthesis

Elaeagnus commutata (silverberry)  
www.nrfirescience.org/resource/10632  
This FEIS species review synthesizes information on the relationship of Elaeagnus commutata (silverberry) 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

Asio flammeus (short-eared owl)  
www.nrfirescience.org/resource/10725  
This FEIS species review synthesizes information on the relationship of Asio flammeus (short-eared 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 used...  
Author(s): Janet L. Howard  
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

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

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

Bromus pumellianus (Pumpelly brome)
www.nrfirescience.org/resource/10915
This FEIS species review synthesizes information on the relationship of Bromus pumellianus (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

Dumetella carolinensis (gray catbird)
www.nrfirescience.org/resource/10516
This FEIS species review synthesizes information on the relationship of Dumetella carolinensis (gray catbird) 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

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
Deschampsia elongata (slender hairgrass)

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

Fire conditions and pre- and postoccurrence of annual grasses on the Snake River Plain

Fire has been an important factor in the development of the vegetation of the Snake River Plain. Prior to Euro-American influence, fire helped determine the physiognomy and species composition of many communities. The occurrence of fire varied widely depending on the vegetation present, topography, and other factors. This impact can...

Author(s): Erin F. Peters, Stephen C. Bunting
Year Published: 1994
Type: Document

Rudbeckia hirta (black-eyed Susan)

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

Brachylagus idahoensis (pygmy rabbit)

This FEIS species review synthesizes information on the relationship of Brachylagus idahoensis (pygmy rabbit) 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: 1994
Type: Document
Synthesis

Chamaebatiaria millefolium (desert sweet)

This FEIS species review synthesizes information on the relationship of Chamaebatiaria millefolium (desert sweet) to fire--how fire affects the species and its habitat, and fire management considerations.
Diatom assemblages of streams influenced by wildfire
www.nrfirescience.org/resource/18646
The Greater Yellowstone Area ecosystem experienced major wildfires in 1988, resulting in a substantial number of catchments being burned. We studied diatom assemblage structure at 14 sites over 5 years in catchments ranging from 0 to over 90% burned. Coefficients of variation for selected physical measures provided a good assessment...
Author(s): Christopher T. Robinson, Samuel R. Rushforth, G. Wayne Minshall
Year Published: 1994
Type: Document
Book or Chapter or Journal Article

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

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

Buteo jamaicensis (red-tailed hawk)
www.nrfirescience.org/resource/10551
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
Type: Document
Synthesis
Falco mexicanus (prairie falcon)
www.nrfirescience.org/resource/10541
This FEIS species review synthesizes information on the relationship of Falco mexicanus (prairie falcon) 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

Carex garberi (Garber sedge)
www.nrfirescience.org/resource/10924
This FEIS species review synthesizes information on the relationship of Carex garberi (Garber 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 used...
Author(s): Roberta A. Walsh
Year Published: 1994
Type: Document
Synthesis

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

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

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...
Carex capitata (capitate sedge)
www.nrfirescience.org/resource/10926
This FEIS species review synthesizes information on the relationship of Carex capitata (capitate 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 used...
Author(s): Roberta A. Walsh
Year Published: 1994
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

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

Oplopanax horridus (devil's club)
www.nrfirescience.org/resource/10720
This FEIS species review synthesizes information on the relationship of Oplopanax horridus (devil's club) 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: 1993
Type: Document
Synthesis

Anas acuta (northern pintail)
This FEIS species review synthesizes information on the relationship of Anas acuta (northern pintail) 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

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
Type: Document
Synthesis

Grus americana (whooping crane)

This FEIS species review synthesizes information on the relationship of Grus americana (whooping crane) 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

Aythya valisineria (canvasback)

This FEIS species review synthesizes information on the relationship of Aythya valisineria (canvasback) 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

Arnica cordifolia (heartleaf arnica)

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
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
Synthesis

Anas platyrhynchos (mallard)
www.nrfirescience.org/resource/10848
This FEIS species review synthesizes information on the relationship of Anas platyrhynchos (mallard) 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): S. A. Snyder
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

Atriplex gardneri (Gardner's saltbush)
www.nrfirescience.org/resource/10810
This FEIS species review synthesizes information on the relationship of Atriplex gardneri (Gardner's saltbush) 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): William R. Reed
Year Published: 1993
Type: Document
Synthesis

Lewisia rediviva (bitterroot)
www.nrfirescience.org/resource/10736
This FEIS species review synthesizes information on the relationship of Lewisia rediviva (bitterroot) to
Zigadenus paniculatus (foothill deathcamas)
www.nrfirescience.org/resource/10707
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 can be used...
Author(s): Janet L. Howard
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

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

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...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis
Amaranthus retroflexus (rough pigweed)

www.nrfirescience.org/resource/10480

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

Trifolium repens (white clover)

www.nrfirescience.org/resource/10617

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

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

Linnaea borealis (twinflower)

www.nrfirescience.org/resource/10737

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 species review can be used...

Author(s): Janet L. Howard
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

**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

**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

**Picea pungens (blue spruce)**
www.nrfirescience.org/resource/10805
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

**Anas discors (blue-winged teal)**
www.nrfirescience.org/resource/10557
This FEIS species review synthesizes information on the relationship of Anas discors (blue-winged teal) 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
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

Branta canadensis (Canada goose)
www.nrfirescience.org/resource/10847
This FEIS species review synthesizes information on the relationship of Branta canadensis (Canada goose) 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

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
Year Published: 1993
Type: Document
Synthesis

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

Liatris punctata (blazing star)
www.nrfirescience.org/resource/10920
This FEIS species review synthesizes information on the relationship of Liatris punctata (blazing star) 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): Roberta A. Walsh
Anas crecca (green-winged teal)

This FEIS species review synthesizes information on the relationship of Anas crecca (green-winged teal) 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

Cygnus buccinator (trumpeter swan)

This FEIS species review synthesizes information on the relationship of Cygnus buccinator (trumpeter swan) 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
Synthesis

Collema tenax (black lichen)

This FEIS species review synthesizes information on the relationship of Collema tenax (black 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 be used...

Author(s): Robin F. Matthews

Year Published: 1993
Type: Document
Synthesis

Pediomelum hypogaeum (subterranean Indian breadroot)

This FEIS species review synthesizes information on the relationship of Pediomelum hypogaeum (subterranean Indian breadroot) 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): Janet L. Howard

Year Published: 1993
Type: Document
Synthesis

Ovis canadensis (bighorn sheep)

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...
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

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

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

Panicum virgatum (switchgrass)
www.nrfirescience.org/resource/10580
This FEIS species review synthesizes information on the relationship of Panicum virgatum (switchgrass) 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: 1993
Type: Document
Synthesis

Salix brachycarpa (barren-ground willow)
www.nrfirescience.org/resource/10619
This FEIS species review synthesizes information on the relationship of Salix brachycarpa (barren-ground 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...

Author(s): Milo Coladonato
Year Published: 1993
Type: Document
**Haliaeetus leucocephalus (bald eagle)**

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

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**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

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**Blechnum spicant (deer fern)**

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

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**Anser albifrons (greater white-fronted goose)**

This FEIS species review synthesizes information on the relationship of Anser albifrons (greater white-fronted goose) 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: 1993  
Type: Document  
Synthesis

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**Eurybia conspicua (showy aster)**

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

**Iliamna rivularis (wild hollyhock)**
[www.nrfirescience.org/resource/10760](http://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...

Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

**Rapid decline of whitebark pine in western Montana: evidence from 20-year re-measurements**
[www.nrfirescience.org/resource/12916](http://www.nrfirescience.org/resource/12916)

Whitebark pine (*Pinus albicaulis*), an important producer of food for wildlife, is decreasing in abundance in western Montana due to attacks by the white pine blister rust fungus (*Cronartium ribicola*), epidemics of mountain pine beetle (*Dendroctonus ponderosae*) and successional replacement mainly by subalpine fir (*Abies lasiocarpa*)....

Author(s): Robert E. Keane, Stephen F. Arno
Year Published: 1993
Type: Document
Book or Chapter or Journal Article

**Castor canadensis (American beaver)**
[www.nrfirescience.org/resource/10547](http://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...

Author(s): Julie L. Tesky
Year Published: 1993
Type: Document
Synthesis

**Dracocephalum parviflorum (American dragonhead)**
[www.nrfirescience.org/resource/10761](http://www.nrfirescience.org/resource/10761)

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
**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

**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

**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

**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

**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...
Cygnus columbianus (tundra swan)
www.nrfirescience.org/resource/10544
This FEIS species review synthesizes information on the relationship of Cygnus columbianus (tundra swan) 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...

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...

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...

Peltigera apthosa (green dog lichen)
www.nrfirescience.org/resource/10773
This FEIS species review synthesizes information on the relationship of Peltigera apthosa (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...

Schoenoplectus tabernaemontani (soft-stem bulrush)
This FEIS species review synthesizes information on the relationship of Schoenoplectus tabernaemontani (soft-stem bulrush) 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): S. A. Snyder
Year Published: 1993
Type: Document
Synthesis

Delphinium bicolor (low larkspur)
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...
Author(s): Robin F. Matthews
Year Published: 1993
Type: Document
Synthesis

Rosa gymnocarpa (baldhip rose)
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

Lutra canadensis (northern river otter)
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

Circus cyaneus (northern harrier)
This FEIS species review synthesizes information on the relationship of Circus cyaneus (northern harrier) 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
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

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

Helianthus maximiliani (Maximilian sunflower)
www.nrfirescience.org/resource/10912
This FEIS species review synthesizes information on the relationship of Helianthus maximiliani (Maximilian sunflower) 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): Roberta A. Walsh
Year Published: 1993
Type: Document
Synthesis

Pandion haliaetus (osprey)
www.nrfirescience.org/resource/10537
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 compressa (Canada bluegrass)
www.nrfirescience.org/resource/10578
This FEIS species review synthesizes information on the relationship of Poa compressa (Canada
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

Chen caerulescens (snow goose)
www.nrfirescience.org/resource/10844
This FEIS species review synthesizes information on the relationship of Chen caerulescens (snow goose) 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): S. A. Snyder
Year Published: 1993
Type: Document
Synthesis

Equisetum sylvaticum (wood horsetail)
www.nrfirescience.org/resource/10776
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

Anas strepera (gadwall)
www.nrfirescience.org/resource/10553
This FEIS species review synthesizes information on the relationship of Anas strepera (gadwall) 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
Schoenoplectus americanus (Olney's threesquare bulrush)
www.nrfirescience.org/resource/10565
This FEIS species review synthesizes information on the relationship of Schoenoplectus americanus (Olney's threesquare bulrush) 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): Ronald Uchytil
Year Published: 1992
Type: Document
Synthesis

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

Carex bigelowii (Bigelow sedge)
www.nrfirescience.org/resource/10766
This FEIS species review synthesizes information on the relationship of Carex bigelowii (Bigelow 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 used...
Author(s): Robin F. Matthews
Year Published: 1992
Type: Document
Synthesis

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
Synthesis

Xanthium strumarium (common cocklebur)
www.nrfirescience.org/resource/10445
This FEIS species review synthesizes information on the relationship of Xanthium strumarium (common cocklebur) 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
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...

Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

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

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

This FEIS species review synthesizes information on the relationship of Viburnum edule (highbush cranberry) 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: 1992
Type: Document
Synthesis
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
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

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

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...
Author(s): Lora L. Esser
Year Published: 1992
Type: Document
Synthesis

Salix glauca (grayleaf willow)
www.nrfirescience.org/resource/10581
This FEIS species review synthesizes information on the relationship of Salix glauca (grayleaf 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
Agrostis scabra (ticklegass)
www.nrfirescience.org/resource/10769
This FEIS species review synthesizes information on the relationship of Agrostis scabra (ticklegass) 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

Ambrosia psilostachya (western ragweed)
www.nrfirescience.org/resource/10807
This FEIS species review synthesizes information on the relationship of Ambrosia psilostachya (western ragweed) 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: 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

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

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
Synthesis

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 can be...

Author(s): Janet L. Howard
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

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

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...

Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis
Meleagris gallopavo (wild turkey)
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

Pinus ponderosa var. ponderosa (Pacific ponderosa pine)
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

Salix monticola (mountain willow)
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

Halogeton glomeratus (halogeton)
This FEIS species review synthesizes information on the relationship of Halogeton glomeratus (halogeton) 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): Diane S. Pavek
Year Published: 1992
Type: Document
Synthesis

Hylocomium splendens (splendid feather moss)
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...
**Elymus repens (quackgrass)**
www.nrfirescience.org/resource/10470
This FEIS species review synthesizes information on the relationship of Elymus repens (quackgrass) 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): S. A. Snyder
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

**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
Synthesis

**Tsuga mertensiana (mountain hemlock)**
www.nrfirescience.org/resource/10559
This FEIS species review synthesizes information on the relationship of Tsuga mertensiana (mountain 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...
Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

**Menziesia ferruginea (menziesia)**
Menziesia ferruginea (menziesia)

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

Calamagrostis purpurascens (purple pinegrass)

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...

Author(s): Julie L. Tesky
Year Published: 1992
Type: Document
Synthesis

Symphiotrichum leave (smooth blue American-aster)

This FEIS species review synthesizes information on the relationship of Symphiotrichum leave (smooth blue American-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...

Author(s): Janet Sullivan
Year Published: 1992
Type: Document
Synthesis

Medicago sativa (alfalfa)

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

Spartina pectinata (prairie cordgrass)

This FEIS species review synthesizes information on the relationship of Spartina pectinata (prairie cordgrass) 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): Crystal J. Walkup
Year Published: 1991
Shepherdia canadensis (russet buffaloberry)

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

Spiraea betulifolia (white spirea)

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

Athyrium filix-femina (lady fern)

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

Odocoileus virginianus (white-tailed deer)

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

Canis lupus (gray wolf)

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

**Picea engelmannii (Engelmann spruce)**
[www.nrfirescience.org/resource/10569](www.nrfirescience.org/resource/10569)
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 management. This species review can be...

Author(s): Ronald Uchytil
Year Published: 1991
Type: Document
Synthesis

**Salix drummondiana (Drummond willow)**
[www.nrfirescience.org/resource/10566](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

**Betula papyrifera (paper birch)**
[www.nrfirescience.org/resource/10570](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

**Sorghastrum nutans (Indiangrass)**
[www.nrfirescience.org/resource/10907](www.nrfirescience.org/resource/10907)
This FEIS species review synthesizes information on the relationship of Sorghastrum nutans (Indiangrass) 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
Hesperostipa spartea (porcupine grass)
www.nrfirescience.org/resource/10910
This FEIS species review synthesizes information on the relationship of Hesperostipa spartea (porcupine 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...
Author(s): Crystal J. Walkup
Year Published: 1991
Type: Document
Synthesis

Crataegus douglasii (Douglas hawthorn)
www.nrfirescience.org/resource/10690
This FEIS species review synthesizes information on the relationship of Crataegus douglasii (Douglas hawthorn) 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): 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

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...
Author(s): Ronald Uchytil
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
Carex lenticularis var. dolia (Kellog's sedge)
www.nrfirescience.org/resource/10934
This FEIS species review synthesizes information on the relationship of Carex lenticularis var. dolia (Kellog's 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...

Author(s): Tara Y. Williams, William C. Fischer
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

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

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
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

Symphoricarpos mollis (creeping snowberry)
www.nrfirescience.org/resource/10838
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

Larix lyallii (alpine larch)
www.nrfirescience.org/resource/10689
This FEIS species review synthesizes information on the relationship of Larix lyallii (alpine larch) 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): James R. Habeck
Year Published: 1991
Type: Document
Synthesis

Abies lasiocarpa, Abies lasiocarpa var. arizonica, Abies lasiocarpa var. lasiocarpa (subalpine fir, corkbark fir, subalpine fir)
www.nrfirescience.org/resource/10574
This FEIS species review synthesizes information on the relationship of Abies lasiocarpa, Abies lasiocarpa var. arizonica, Abies lasiocarpa var. lasiocarpa (subalpine fir, corkbark fir, subalpine fir) to fire—how fire affects the species and its habitat, and fire management considerations. Information is also provided on the...
Author(s): Ronald Uchytil
Year Published: 1991
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...
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): Marilyn F. Crane
Year Published: 1990
Type: Document
Synthesis

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): Tara Y. Williams
Year Published: 1990
Type: Document
Synthesis

Vaccinium myrtilloides (velvetleaf blueberry)
www.nrfirescience.org/resource/10873
This FEIS species review synthesizes information on the relationship of Vaccinium myrtilloides (velvetleaf blueberry) 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: 1990
Type: Document
Synthesis

Proceedings-symposium on whitebark pine ecosystems: Ecology and management of a high-mountain resource
www.nrfirescience.org/resource/20057
Includes 52 papers and 14 poster synopses that present current knowledge about ecosystems where whitebark pine and associated flora and fauna predominate. This was the first symposium to explore the ecology and management of these ecosystems, which are becoming increasingly important.

Year Published: 1990
Type: Document
Conference Proceedings

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

Berberis nervosa (dwarf Oregon-grape)
www.nrfirescience.org/resource/10885
This FEIS species review synthesizes information on the relationship of Berberis nervosa (dwarf Oregon-grape) 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

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

Botrychium montanum (mountain moonwort)
www.nrfirescience.org/resource/10929
This FEIS species review synthesizes information on the relationship of Botrychium montanum (mountain moonwort) 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

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
**Lathyrus bijugatus (pinewoods sweetpea)**

This FEIS species review synthesizes information on the relationship of Lathyrus bijugatus (pinewoods sweetpea) 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

**Celtis reticulata (netleaf hackberry)**

This FEIS species review synthesizes information on the relationship of Celtis reticulata (netleaf hackberry) 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

**Oxytropis campestris var. columbiana (Columbia River crazyweed)**

This FEIS species review synthesizes information on the relationship of Oxytropis campestris var. columbiana (Columbia River crazyweed) 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...

Author(s): Tara Y. Williams  
Year Published: 1990  
Type: Document  
Synthesis

**Rosa acicularis (prickly rose)**

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

**Botrychium paradoxum (peculiar moonwort)**

This FEIS species review synthesizes information on the relationship of Botrychium paradoxum (peculiar moonwort) 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): Tara Y. Williams
Year Published: 1990
Type: Document
Synthesis

**Vaccinium ovalifolium (ovalleaf huckleberry)**
www.nrfirescience.org/resource/10874
This FEIS species review synthesizes information on the relationship of Vaccinium ovalifolium (ovalleaf 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...

Author(s): D. A. Tirmenstein
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

**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

**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
Vaccinium parvifolium (red huckleberry)

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

Selaginella densa (little spikemoss)

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

Salix lemmonii (Lemmons willow)

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...

Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

Sambucus nigra subsp. cerulea (blue elderberry)

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

Alnus rubra (red alder)

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...
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...

Rubus discolor (Himalayan blackberry)
www.nrfirescience.org/resource/10477
This FEIS species review synthesizes information on the relationship of Rubus discolor (Himalayan 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...

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...

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...

Salix lucida subsp. lasiandra (Pacific willow)
Alnus rhombifolia (white alder)

This FEIS species review synthesizes information on the relationship of Alnus rhombifolia (white 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...

Author(s): Ronald Uchytil
Year Published: 1989
Type: Document
Synthesis

FIRESUM-an ecological process model for fire succession in western conifer forests

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

Polystichum munitum (western sword fern)

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

Rubus spectabilis (salmonberry)

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
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

Riparian vegetation dynamics in relation to channel shifting and fire
www.nrfirescience.org/resource/18466
The riparian vegetation along the Bighorn River in Wyoming forms a complex mosaic comprised of cottonwood (Populus deltoides) groves, meadows, marshes, and several kinds of shrubland. Changes in the riparian mosaic during the last 50 years were reconstructed using tree ring analysis and aerial photos taken over the river in 1938,...
Author(s): Y. Akashi, Dennis H. Knight
Year Published: 1988
Type: Document
Conference Proceedings

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 management. This species review can be...
Author(s): Ronald Uchytil
Year Published: 1988
Type: Document
Synthesis

The role of disturbance in stream ecology
www.nrfirescience.org/resource/18630
We define disturbance in stream ecosystems to be: any relatively discrete event in time that is characterized by a frequency, intensity, and severity outside a predictable range, and that disrupts ecosystem, community, or population structure and changes resources or the physical environment. Of the three major hypotheses relating...
Author(s): Vincent H. Resh, Arthur V. Brown, Alan P. Covitch, Martin E. Gurtz, Hiram Li, G. Wayne Minshall, Seth R. Reice, Andrew L. Sheldon, J. Bruce Wallace, Robert C. Wissmar
Year Published: 1988
Type: Document
Book or Chapter or Journal Article

Acer negundo (boxelder)
www.nrfirescience.org/resource/10823
This FEIS species review synthesizes information on the relationship of Acer negundo (boxelder) 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): Lynn Rosario
Year Published: 1988
Type: Document
Synthesis

www.nrfirescience.org/resource/12117
Includes more than 90 papers bringing together research accomplishments of the last 10 years including ongoing research on the ecology and management of pinyon-juniper ecosystems. Scientist and management points of view are presented.
Author(s): Richard L. Everett
Year Published: 1987
Type: Document
Conference Proceedings, Technical Report or White Paper

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
Technical Report or White Paper

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
Book or Chapter or Journal Article

Whitebark pine cone crops - a diminishing source of wildlife food
www.nrfirescience.org/resource/19234
Whitebark pine (Pinus albicaulis)s found at timberline and in subalpine forests from central California and western Wyoming north to British Columbia and Alberta. This species as been of little interest for commercial timber, but in recent years its large seeds( average2 ,600/1bh) aveb eenr ecognized as an important food source...
Author(s): Stephen F. Arno
Year Published: 1986
Type: Document
Book or Chapter or Journal Article
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
Type: Document
Technical Report or White Paper

Effects of disturbance frequency on stream benthic community structure in relation to canopy cover and season
www.nrfirescience.org/resource/18645
Field experiments were conducted to examine the effects of disturbance frequency on invertebrates and periphyton colonizing bricks in a third order Rocky Mountain (USA) stream. After an initial colonization period (30 days), sets of bricks were turned over at intervals of 0, 3, 9, 27, or 54 days. Invertebrate species richness and...
Author(s): Christopher T. Robinson, G. Wayne Minshall
Year Published: 1986
Type: Document
Book or Chapter or Journal Article

Modeling shrub succession following clearcutting and broadcast burning
www.nrfirescience.org/resource/11060
This conceptual model of early seral shrub succession following clearcutting and broadcast burning synthesizes ideas from previous research and modeling approaches into a simple diagrammatic model of the critical successional influences and processes. Illustrative examples are drawn from observations...
Author(s): Penelope Morgan, Leon F. Neuenschwander
Year Published: 1985
Type: Document
Conference Proceedings, Technical Report or White Paper

Fire history at the forest-grassland ecotone in southwestern Montana
www.nrfirescience.org/resource/15375
The history and influence of fires was studied at the forest-grassland ecotone in high valleys of southwestern Montana. Investigations were focused upon several sites having early landscape photographs and modern retakes that allow for detection of vegetation changes. Fire intervals were determined for these sites by analyzing...
Author(s): Stephen F. Arno, George E. Gruell
Year Published: 1983
Type: Document
Book or Chapter or Journal Article

Fire frequency reduced two orders of magnitude in the Bitterroot Canyons, Montana
www.nrfirescience.org/resource/8231
The fire cycle in low-elevation mesic coniferous forests of the Bitterroot Canyons, Montana, has changed from about 60 years before European settlement to about 7500 years between 1910 and 1980. The decreased fire frequency may be responsible for increased severity of western spruce bud worm outbreaks (Choristoneuraoccidentalis...
Fire ecology of Montana forest habitat types east of the Continental Divide
www.nrfirescience.org/resource/11261
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.
Author(s): William C. Fischer, Bruce D. Clayton
Year Published: 1983
Type: Document
Synthesis, Technical Report or White Paper

Dispersal of whitebark pine seeds by Clark's nutcracker: A mutualism hypothesis
www.nrfirescience.org/resource/20060
Abstract (1) Clark's nutcrackers (Nucifraga columbiana) store a mean of only 3.7 whitebark pine (Pinus albicaulis) seeds per cache, which reduces competition for moisture and space. The mean depth at which seeds are stored, 2.0 cm, is compatible with germination requirements, and many sites selected appear suitable for seed...
Author(s): Diana F. Tomback
Year Published: 1982
Type: Document
Book or Chapter or Journal Article

The central role of Clark's nutcracker in the dispersal and establishment of whitebark pine
www.nrfirescience.org/resource/20063
Whitebark pine (Pinus albicaulis) is known to have its seeds harvested and cached in the soil by Clark's Nutcracker (Nucifraga columbiana), and unretrieved seeds are known to be capable of germinating and establishing new pines. Many other vertebrates also harvest and feed on these seeds, however, and the roles of these animals as...
Author(s): H.E. Hutchins, R. M. Lanner
Year Published: 1982
Type: Document
Book or Chapter or Journal Article

Fire ecology of Lolo National Forest habitat types
www.nrfirescience.org/resource/11913
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's influence on wildlife habitat on the Bridger-Teton National Forest, Wyoming - Volume II: changes and causes, management implications
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

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

Wildland fire research needs in the West: Forest Service managers' views

This report discusses fire-related research needs in the western regions of the Forest Service. These needs were expressed by personnel at all management levels. Responses were one part of a more general study designed to establish information requirements for integrating fire into land management planning.

Author(s): Richard J. Barney
Year Published: 1979
Type: Document
Technical Report or White Paper

Fire ecology questions survey: candid expressions of research needs by land managers and scientists in western North America

Contains 910 sets of forest fire ecology questions mailed to the authors by 302 land managers and scientists throughout the western United States and Canada. Questions were submitted in response to a survey of important research needs for understanding the effects of fire and fire exclusion in western coniferous forest ecosystems....

Author(s): Alan R. Taylor, Ronald N. Kickert, David H. Firmage, Mark J. Behan
Year Published: 1975
Type: Document
Technical Report or White Paper

Wildland fires and dwarf mistletoes: a literature review of ecology and prescribed burning

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
30 years of vegetation change following burning of sagebrush-grass range
www.nrfirescience.org/resource/15395
A sagebrush-grass range was burned according to plan in 1936. Long-term results show that sagebrush yields have increased while most other important shrub, grass, and forb yields have decreased. Evaluation by subspecies of sagebrush was helpful in interpreting sagebrush behavior. The return of sagebrush shows the need for planning...
Author(s): Roy O. Harniss, Robert B. Murray
Year Published: 1973
Type: Document
Book or Chapter or Journal Article

Aridity and competition drive fire resistance trait covariation in mountain trees
www.nrfirescience.org/resource/18745
Fire resistance traits drive tree species composition in surface?fire ecosystems, but how they covary at different scales of variation and with the environment is not well documented. We assessed the covariation of bark thickness (BT), tree height, and crown base?to?height ratio across Alpine forests, after accounting for the...
Author(s): Thibaut Fréjaville, Albert Vilà?Cabrera, Thomas Curt, Christopher Carcailllet
Year Published: 1973
Type: Document
Book or Chapter or Journal Article

Climate change, disturbances and landscape dynamics
www.nrfirescience.org/resource/18407
This chapter is within a book by Walker and Steffen that presents a collection of essays by leading authorities who address the current state of knowledge. The chapters bring together the early results of an international scientific research program designed to address what will happen to our ability to produce food and fiber...
Type: Document
Book or Chapter or Journal Article

Proceedings of the fourth fire behavior and fuels conference
www.nrfirescience.org/resource/18396
The Fourth Fire Behavior and Fuels Conference was held in Raleigh, North Carolina, USA, February 18-22, 2013. The theme for this conference was At The Crossroads: Looking Toward the Future in a Changing Environment. Joint sponsorship of the conference was by the International Association of Wildland Fire (IAWF) and the International... 
Author(s): Dale D. Wade, Rebekah L. Fox
Type: Document
Conference Proceedings