

### **Comparative methods for reconstructing fire histories at the stand scale using charcoal records in peat and mineral soils**

[www.nrfirescience.org/resource/19012](http://www.nrfirescience.org/resource/19012)

Analysis and <sup>14</sup>C dating of charcoal fragments >2 mm buried in mineral soils make it possible to obtain a stand-scale portrait of Holocene fires that occurred in well-drained, fire-prone environments, as well as changes in forest stand composition over time, based on botanical identification of charcoals.

However, it is not...

Author(s): Pierre-Luc Couillard, Joanie Tremblay, Martin Lavoie, Serge Payette

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

### **The effects of previous wildfires on subsequent wildfire behavior and post-wildfire recovery**

[www.nrfirescience.org/resource/12650](http://www.nrfirescience.org/resource/12650)

Over the past several decades, size and extent of wildfires have been increasing in the western United States (Westerling et al. 2006; Littell et al. 2009). As the number and size of recent wildfires increases across landscapes, fire managers are questioning how past wildfires may influence the spread and effects of subsequent...

Author(s): Camille Stevens-Rumann, Susan J. Prichard, Penelope Morgan

Year Published: 2019

Type: Document

Synthesis

### **Repeated fires reduce plant diversity in low-elevation Wyoming big sagebrush ecosystems (1984–2014)**

[www.nrfirescience.org/resource/19047](http://www.nrfirescience.org/resource/19047)

Sagebrush is one of the most imperiled ecosystems in western North America, having lost about half of its original 62 million hectare extent. Annual grass invasions are known to be increasing wildfire occurrence and burned area, but the lasting effects (greater than five years post-fire) that the resulting reburns have on these...

Author(s): Adam L. Mahood, Jennifer Balch

Year Published: 2019

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](http://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

### **Sparking New Opportunities for Charcoal-Based Fire History Reconstructions**

[www.nrfirescience.org/resource/17103](http://www.nrfirescience.org/resource/17103)

Paleofire research is the study of past fire regimes using a suite of proxies (frequency, area burned, severity, intensity, etc.). Charcoal preserved in sedimentary archives constitutes one of the most

ubiquitous measures of past fire regimes along with fire-scarred tree rings, chemical markers of fire, and black carbon residue [1,2...

Author(s): Julie C. Aleman, Andy Hennebelle, Boris Vanni re, Olivier Blarquez, Global Paleofire Working Group

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

### **High severity fire: evaluating its key drivers and mapping its probability across western US forests**

[www.nrfirescience.org/resource/17224](http://www.nrfirescience.org/resource/17224)

Wildland fire is a critical process in forests of the western United States (US). Variation in fire behavior, which is heavily influenced by fuel loading, terrain, weather, and vegetation type, leads to heterogeneity in fire severity across landscapes. The relative importance of these factors in driving fire severity, however, is...

Author(s): Sean A. Parks, Lisa M. Holsinger, Matthew Panunto, William Matt Jolly, Solomon Z. Dobrowski, Gregory K. Dillon

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/16433](http://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

Synthesis

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

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

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

Author(s): Diane M. Smith

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Fire-regime variability impacts forest carbon dynamics for centuries to millennia**

[www.nrfirescience.org/resource/15548](http://www.nrfirescience.org/resource/15548)

Wildfire is a dominant disturbance agent in forest ecosystems, shaping important biogeochemical processes including net carbon (C) balance. Long-term monitoring and chronosequence studies highlight a resilience of biogeochemical properties to large, stand-replacing, high-severity fire events. In contrast, the consequences of...

Author(s): Tara W. Hudiberg, Philip E. Higuera, Jeffrey A. Hicke

Year Published: 2017

Type: Document  
Book or Chapter or Journal Article

### **Quantifying the effect of elevation and aspect on fire return intervals in the Canadian Rocky Mountains**

[www.nrfirescience.org/resource/15032](http://www.nrfirescience.org/resource/15032)

The effect of topography on wildfire distribution in the Canadian Rockies has been the subject of debate. We suspect the size of the study area, and the assumption fire return intervals are distributed as a Weibull distribution used in many previous studies may have obscured the real effect of topography on these fire-regulated...

Author(s): Marie-Pierre Rogeau, Glen W. Armstrong

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

### **Disturbance regimes and the historical range and variation in terrestrial ecosystems**

[www.nrfirescience.org/resource/16549](http://www.nrfirescience.org/resource/16549)

Picture a tranquil landscape with undulating topography, idyllic streams, scenic glades, and verdant vegetation. Left to its own devices, this landscape would eventually become dominated by late successional communities that would slowly shift in composition and structure in response to climate fluctuations over long time periods....

Author(s): Robert E. Keane

Year Published: 2017

Type: Document

Synthesis

### **Fire history and fire-climate interactions in high elevation whitebark pine dominated forest**

[www.nrfirescience.org/resource/15767](http://www.nrfirescience.org/resource/15767)

The objectives of this study were to identify whitebark pine fire-climate interactions, and tree establishment and mortality patterns in a landscape context. Specific objectives were to : 1) develop a whitebark pine tree-ring chronology to date fire scar samples and reconstruct climate from tree rings; 2) identify fire climate...

Author(s): Alan H. Taylor, Catherine Airey Lauvaux

Year Published: 2017

Type: Document

Technical Report or White Paper

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

[www.nrfirescience.org/resource/14847](http://www.nrfirescience.org/resource/14847)

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

Author(s): James D. Johnston, John D. Bailey, Christopher J. Dunn

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **The spatially varying influence of humans on fire probability in North America**

[www.nrfirescience.org/resource/14693](http://www.nrfirescience.org/resource/14693)

Humans affect fire regimes by providing ignition sources in some cases, suppressing wildfires in others, and altering natural vegetation in ways that may either promote or limit fire. In North America, several studies have evaluated the effects of society on fire activity; however, most studies have been regional or subcontinental...

Author(s): Marc-Andre Parisien, Carol Miller, Sean A. Parks, Evan R. DeLancey, Francois-Nicolas Robinne, Michael D. Flannigan

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Quantifying the human influence on fire ignition across the western USA**

[www.nrfirescience.org/resource/14896](http://www.nrfirescience.org/resource/14896)

Humans have a profound effect on fire regimes by increasing the frequency of ignitions. Although ignition is an integral component of understanding and predicting fire, to date fire models have not been able to isolate the ignition location, leading to inconsistent use of anthropogenic ignition proxies. Here, we identified fire...

Author(s): Emily J. Fusco, John T. Abatzoglou, Jennifer Balch, John T. Finn, Bethany A. Bradley

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Sensitivity of reconstructed fire histories to detection criteria in mixed-severity landscapes**

[www.nrfirescience.org/resource/14818](http://www.nrfirescience.org/resource/14818)

In heterogeneous forest landscapes prone to wildfires, accurate classification of the fire regime beyond direct observations and records is difficult. This is in part due to the methods used to reconstruct historical fires in complex, heterogeneous landscapes with varying fire severities. Mixed-severity fire regimes, defined as...

Author(s): Vanessa Stretch, Ze'ev Gedalof, Jacklyn Cockburn, Michael F. Pisaric

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

### **Briefing: climate and wildfire in western U.S. forests**

[www.nrfirescience.org/resource/12991](http://www.nrfirescience.org/resource/12991)

Wildfire in western U.S. federally managed forests has increased substantially in recent decades, with large (>1000 acre) fires in the decade through 2012 over five times as frequent (450 percent increase) and burned area over ten times as great (930 percent increase) as the 1970s and early 1980s. These changes are closely linked...

Author(s): Anthony L. Westerling, Timothy J. Brown, Tania L. Schoennagel, Thomas W. Swetnam, Monica G. Turner, Thomas T. Veblen

Year Published: 2014

Type: Document

Technical Report or White Paper

### **Northern Rockies pyrogeography: an example of fire atlas utility**

[www.nrfirescience.org/resource/12923](http://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

**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](http://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 ( $p < 0.05$ )...

Author(s): E. Natasha Stavros, John T. Abatzoglou, Donald McKenzie, Narasimhan K. Larkin  
Year Published: 2014  
Type: Document  
Book or Chapter or Journal Article

**Large wildfire trends in the western United States, 1984-2011**

[www.nrfirescience.org/resource/12971](http://www.nrfirescience.org/resource/12971)

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

**Duff mound consumption and cambium injury for centuries-old western larch from prescribed burning in western Montana**

[www.nrfirescience.org/resource/11974](http://www.nrfirescience.org/resource/11974)

Western larch is one of the most fire-adapted conifers in western North America. Its historical perpetuation depended upon regular fire disturbances, which creates open stand conditions and mineral seedbeds. A stand of 200- to 500-year-old larch in western Montana with deep duff mounds resulting from an unusually long 150-year fire...

Author(s): Michael G. Harrington  
Year Published: 2013  
Type: Document  
Book or Chapter or Journal Article

**Landscape-scale eco-evolutionary dynamics: selection by seed predators and fire determine a major reproductive strategy**

[www.nrfirescience.org/resource/11982](http://www.nrfirescience.org/resource/11982)

Recent work in model systems has demonstrated significant effects of rapid evolutionary change on ecological processes (eco-evolutionary dynamics). Fewer studies have addressed whether eco-evolutionary dynamics structure natural ecosystems. We investigated variation in the frequency of serotiny in lodgepole pine (*Pinus contorta*), a...

Author(s): Matt V. Talluto, Craig W. Benkman  
Year Published: 2013  
Type: Document  
Book or Chapter or Journal Article

### **Characterizing fire-on-fire interactions in three large wilderness areas**

[www.nrfirescience.org/resource/8339](http://www.nrfirescience.org/resource/8339)

The interaction of fires, where one fire burns into another recently burned area, is receiving increased attention from scientists and land managers wishing to describe the role of fire scars in affecting landscape pattern and future fire spread. Here, we quantify fire-on-fire interactions in terms of frequency, size, and time-since...

Author(s): Casey Teske, Carl A. Seielstad, Lloyd P. Queen

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Changing growth response to wildfire in old-growth ponderosa pine trees in montane forests of north central Idaho**

[www.nrfirescience.org/resource/8323](http://www.nrfirescience.org/resource/8323)

North American fire-adapted forests are experiencing changes in fire frequency and climate. These novel conditions may alter post-wildfire responses of fire-adapted trees that survive fires, a topic that has received little attention. Historical, frequent, low-intensity wildfire in many fire-adapted forests is generally thought to...

Author(s): Eric G. Keeling, Anna Sala

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Long-term perspective on wildfires in the western USA**

[www.nrfirescience.org/resource/8309](http://www.nrfirescience.org/resource/8309)

Understanding the causes and consequences of wildfires in forests of the western United States requires integrated information about fire, climate changes, and human activity on multiple temporal scales. We use sedimentary charcoal accumulation rates to construct long-term variations in fire during the past 3,000 y in the American...

Author(s): Jennifer R. Marlon, Patrick J. Bartlein, Daniel G. Gavin, Colin J. Long, R. Scott Anderson, Christy E. Briles, Kendrick J. Brown, Daniele Colombaroli, Douglas J. Hallett, Mitchell J. Power, Elizabeth A. Scharf, Megan K. Walsh

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Does proxy uncertainty affect the relations inferred between the Pacific Decadal Oscillation and wildfire activity in the western United States?**

[www.nrfirescience.org/resource/8310](http://www.nrfirescience.org/resource/8310)

We examined a set of five proxy reconstructions of the Pacific Decadal Oscillation (PDO) to test whether the choice of reconstruction affected the association between the PDO and widespread forest fires in the western United States. Exact binomial tests suggest the PDO has little direct impact on wildfires, with a statistically...

Author(s): Kurt F. Kipfmüller, Evan R. Larson, Scott St. George

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

### **Lack of fire has limited physiological impact on old-growth ponderosa pine in dry montane**

### **forests of north-central Idaho**

[www.nrfirescience.org/resource/8299](http://www.nrfirescience.org/resource/8299)

Reduced frequency of fire in historically fire-adapted ecosystems may have adverse effects on ecosystem structure, function, and resilience. Lack of fire increases stand density and promotes successional replacement of seral dominant trees by late-successional, more shade-tolerant species. These changes are thought to increase...

Author(s): Eric G. Keeling, Anna Sala, Thomas H. DeLuca

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

### **Disturbance ecology of high-elevation five-needle pine ecosystems in western North America**

[www.nrfirescience.org/resource/11896](http://www.nrfirescience.org/resource/11896)

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

Author(s): Elizabeth M. Campbell, Robert E. Keane, Evan R. Larson, Michael P. Murray, Anna W. Schoettle, Carmen Wong

Year Published: 2011

Type: Document

Conference Proceedings, Synthesis

### **Synthesis of knowledge: fire history and climate change**

[www.nrfirescience.org/resource/12582](http://www.nrfirescience.org/resource/12582)

This report synthesizes available fire history and climate change scientific knowledge to aid managers with fire decisions in the face of ongoing 21st Century climate change. Fire history and climate change (FHCC) have been ongoing for over 400 million years of Earth history, but increasing human influences during the Holocene epoch...

Author(s): William T. Sommers, Stanley G. Coloff, Susan G. Conard

Year Published: 2011

Type: Document

Synthesis, Technical Report or White Paper

### **Fire and climate variation in western North America from fire-scar and tree-ring networks**

[www.nrfirescience.org/resource/8221](http://www.nrfirescience.org/resource/8221)

Fire regimes (i.e., the pattern, frequency and intensity of fire in a region) reflect a complex interplay of bottom-up and top-down controls (Lertzman et al., 1998; McKenzie et al., in press). Bottom-up controls include local variations in topographic, fuel and weather factors at the time of a burn (e.g., fuel moisture and...

Author(s): Donald A. Falk, Emily K. Heyerdahl, Peter M. Brown, Thomas W. Swetnam, Elaine Kennedy Sutherland, Ze'ev Gedalof, Larissa L. Yocom, Timothy J. Brown

Year Published: 2010

Type: Document

Book or Chapter or Journal Article, Synthesis

### **The myth of "catastrophic" wildfire - a new ecological paradigm of forest health**

[www.nrfirescience.org/resource/16302](http://www.nrfirescience.org/resource/16302)

Every fire season in the western United States, we see on television the predictable images of 100-foot flames spreading through tree crowns, while grim-faced news anchors report how many acres of forest were "destroyed" by the latest "catastrophic" fire. The reaction is understandable. For decades,

countless Smokey the Bear...  
Author(s): Chad T. Hanson  
Year Published: 2010  
Type: Document  
Technical Report or White Paper

### **Widespread increase of tree mortality rates in the western United States**

[www.nrfirescience.org/resource/8321](http://www.nrfirescience.org/resource/8321)

Persistent changes in tree mortality rates can alter forest structure, composition, and ecosystem services such as carbon sequestration. Our analyses of longitudinal data from unmanaged old forests in the western United States showed that background (noncatastrophic) mortality rates have increased rapidly in recent decades, with...

Author(s): Phillip J. van Mantgem, Nathan L. Stephenson, John C. Byrne, Lori D. Daniels, Jerry F. Franklin, Peter Z. Fule, Mark E. Harmon, Andrew J. Larson, Jeremy M. Smith, Alan H. Taylor, Thomas T. Veblen  
Year Published: 2009  
Type: Document  
Book or Chapter or Journal Article

### **Living artifacts: the ancient ponderosa pines of the West**

[www.nrfirescience.org/resource/8160](http://www.nrfirescience.org/resource/8160)

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

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

### **Multi-season climate synchronized historical fires in dry forests (1650-1900), Northern Rockies, USA**

[www.nrfirescience.org/resource/8388](http://www.nrfirescience.org/resource/8388)

Our objective was to infer the climate drivers of regionally synchronous fire years in dry forests of the U.S. northern Rockies in Idaho and western Montana. During our analysis period (1650-1900), we reconstructed fires from 9245 fire scars on 576 trees (mostly ponderosa pine, *Pinus ponderosa* P....

Author(s): Emily K. Heyerdahl, Penelope Morgan, James P. Riser  
Year Published: 2008  
Type: Document  
Book or Chapter or Journal Article

### **Long-term fire history from alluvial fan sediments: the role of drought and climate variability, and implications for management of Rocky Mountain forests**

[www.nrfirescience.org/resource/8203](http://www.nrfirescience.org/resource/8203)

Alluvial fan deposits are widespread and preserve millennial-length records of fire. We used these records to examine changes in fire regimes over the last 2000 years in Yellowstone National Park mixed-conifer forests and drier central Idaho ponderosa pine forests. In Idaho, frequent, small, fire-related erosional events occurred...

Author(s): Jennifer L. Pierce, Grant A. Meyer  
Year Published: 2008  
Type: Document

Book or Chapter or Journal Article

### **Long-term relations among fire, fuel, and climate in the north-western US based on lake-sediment studies**

[www.nrfirescience.org/resource/8202](http://www.nrfirescience.org/resource/8202)

Pollen and high-resolution charcoal records from the north-western USA provide an opportunity to examine the linkages among fire, climate, and fuels on multiple temporal and spatial scales. The data suggest that general charcoal levels were low in the late-glacial period and increased steadily through the last 11 000 years with...

Author(s): Cathy L. Whitlock, Jennifer R. Marlon, Christy E. Briles, Andrea R. Brunelle, Colin J. Long, Patrick J. Bartlein

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/8162](http://www.nrfirescience.org/resource/8162)

Quantifying the historical range and variability of landscape composition and structure using simulation modeling is becoming an important means of assessing current landscape condition and prioritizing landscapes for ecosystem restoration. However, most simulated time series are generated using static climate conditions which fail...

Author(s): Robert E. Keane, Lisa M. Holsinger, Russell A. Parsons, Kathy L. Gray

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](http://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

### **Comparison of fire scars, fire atlases, and satellite data in the northwestern United States**

[www.nrfirescience.org/resource/11427](http://www.nrfirescience.org/resource/11427)

We evaluated agreement in the location and occurrence of 20th century fires recorded in digital fire atlases with those inferred from fire scars that we collected systematically at one site in Idaho and from existing fire-scar reconstructions at four sites in Washington. Fire perimeters were similar for two of three 20th century...

Author(s): Lauren B. Shapiro, Emily K. Heyerdahl, Penelope Morgan

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

### **Recovery of big sagebrush following fire in southwest Montana**

[www.nrfirescience.org/resource/8279](http://www.nrfirescience.org/resource/8279)

Fire plays a large role in structuring sagebrush ecosystems; however, we have little knowledge of how vegetation changes with time as succession proceeds from immediate postfire to mature stands. We sampled at 38 sites in southwest Montana dominated by 3 subspecies of big sagebrush (*Artemisia tridentata* Nutt.). At each site we...

Author(s): Peter Lesica, Stephen V. Cooper, Greg Kudray

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/8223](http://www.nrfirescience.org/resource/8223)

Forest restoration in ponderosa pine and mixed ponderosa pine-Douglas fir forests in the US Rocky Mountains has been highly influenced by a historical model of frequent, low-severity surface fires developed for the ponderosa pine forests of the Southwestern USA. A restoration model, based on this low-severity fire model, focuses on...

Author(s): William L. Baker, Thomas T. Veblen, Rosemary L. Sherriff

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

### **Forest fire and climate change in western North America: insights from sediment charcoal records**

[www.nrfirescience.org/resource/7930](http://www.nrfirescience.org/resource/7930)

Millennial-scale records of forest fire provide important baseline information for ecosystem management, especially in regions with too few recent fires to describe the historical range of variability. Charcoal records from lake sediments and soil profiles are well suited for reconstructing the incidence of past fire and its...

Author(s): Daniel G. Gavin, Douglas J. Hallett, Feng S. Hu, Kenneth P. Lertzman, Susan J. Prichard, Kendrick J. Brown, Jason A. Lynch, Patrick J. Bartlein, David L. Peterson

Year Published: 2007

Type: Document

Book or Chapter or Journal Article, Synthesis

### **Fire exclusion and nitrogen mineralization in low elevation forests of western Montana**

[www.nrfirescience.org/resource/8291](http://www.nrfirescience.org/resource/8291)

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

Author(s): M. Derek MacKenzie, Thomas H. DeLuca, Anna Sala

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

### **The complexity of managing fire-dependent ecosystems in wilderness: relict ponderosa pine in the Bob Marshall Wilderness**

[www.nrfirescience.org/resource/7953](http://www.nrfirescience.org/resource/7953)

Isolated wilderness ecosystems with a history of frequent, low-severity fires have been altered due to many decades of fire exclusion and, as a result, are difficult to restore for philosophical and logistical

reasons. In this paper, we describe the successional conditions of ponderosa pine (*Pinus ponderosa*) communities along the...

Author(s): Robert E. Keane, Stephen F. Arno, Laura J. Dickinson

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/7942](http://www.nrfirescience.org/resource/7942)

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

Author(s): Emily K. Heyerdahl, Richard F. Miller, Russell A. Parsons

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

### **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](http://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

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

[www.nrfirescience.org/resource/7919](http://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

### **Fire ecology of ponderosa pine and the rebuilding of fire-resilient ponderosa pine ecosystems**

[www.nrfirescience.org/resource/11074](http://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<sup>-1</sup> (20-50 trees acre<sup>-1</sup>) to a range...

Author(s): Stephen A. Fitzgerald

Year Published: 2005

Type: Document

**Culturally scarred trees in the Bob Marshall Wilderness, Montana, USA- interpreting Native American historical forest use in a wilderness area**

[www.nrfirescience.org/resource/7966](http://www.nrfirescience.org/resource/7966)

Wilderness areas are primarily set aside to protect natural ecosystems and processes. However, most protected areas have a long history of native peoples' land use predating their protection. The general paucity of evidence in the form of historical records, in combination with romantic views of native peoples' effects on nature,...

Author(s): Lars Ostlund, Robert E. Keane, Stephen F. Arno, R. Andersson

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

**Dry forests and wildland fires of the inland Northwest USA: contrasting the landscape ecology of the pre-settlement and modern eras**

[www.nrfirescience.org/resource/7941](http://www.nrfirescience.org/resource/7941)

Prior to Euro-American settlement, dry ponderosa pine and mixed conifer forests (hereafter, the 'dry forests') of the Inland Northwest were burned by frequent low- or mixed-severity fires. These mostly surface fires maintained low and variable tree densities, light and patchy ground fuels, simplified forest structure, and favored...

Author(s): Paul F. Hessburg, James K. Agee, Jerry F. Franklin

Year Published: 2005

Type: Document

Book or Chapter or Journal Article, Synthesis

**Restoration of ponderosa pine forests in the interior western U.S. after logging, grazing, and fire suppression**

[www.nrfirescience.org/resource/8195](http://www.nrfirescience.org/resource/8195)

No description entered.

Author(s): Merrill R. Kaufmann, Kevin C. Ryan, Peter Z. Fule, William H. Romme

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

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

[www.nrfirescience.org/resource/7903](http://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*...

Author(s): Theresa B. Jain, Russell T. Graham

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

**Forest structure and organic horizon analysis along a fire chronosequence in the low elevation forests of western Montana**

[www.nrfirescience.org/resource/8271](http://www.nrfirescience.org/resource/8271)

Although fire consumes much of the forest floor, few studies have examined the change in forest floor

characteristics with increasing time since fire. Mixed forests of ponderosa pine (*Pinus ponderosa* Doug. Ex. laws) and Douglas-fir (*Pseudotsuga mensizii* (Mirb.) Franco) in the inland northwest once burned with greater frequency than...

Author(s): M. Derek MacKenzie, Thomas H. DeLuca, Anna Sala

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

### **The interaction of fire, fuels, and climate across Rocky Mountain forests**

[www.nrfirescience.org/resource/13583](http://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

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

[www.nrfirescience.org/resource/8264](http://www.nrfirescience.org/resource/8264)

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

Author(s): Alisa L. Gallant, Andrew J. Hansen, John S. Councilman, Duane K. Monte, David W. Betz

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

### **Climatic controls on fire-induced sediment pulses in Yellowstone National Park and central Idaho: a long-term perspective**

[www.nrfirescience.org/resource/7962](http://www.nrfirescience.org/resource/7962)

Fire management addressing postfire erosion and aquatic ecosystems tends to focus on short-term effects persisting up to about a decade after fire. A longer perspective is important in understanding natural variability in postfire erosion and sedimentation, the role of these processes in structuring habitat, and future expectations...

Author(s): Grant A. Meyer, Jennifer L. Pierce

Year Published: 2003

Type: Document

Book or Chapter or Journal Article, Synthesis

### **Uncertainty in fire history and restoration of ponderosa pine forests in the western United States**

[www.nrfirescience.org/resource/11026](http://www.nrfirescience.org/resource/11026)

Fire-history data for ponderosa pine forests in the western U.S. have uncertainties and biases.

Targeting multiple-scarred trees and using recorder trees when sampling for fire history may lead to incomplete records. For most of the western U.S., research is insufficient to conclude that high-severity fires did or did not occur in...

Author(s): William L. Baker, Donna S. Ehle

Year Published: 2003  
Type: Document  
Conference Proceedings

### **Interannual to decadal drought and wildfire in the western United States**

[www.nrfirescience.org/resource/8344](http://www.nrfirescience.org/resource/8344)

Twentieth-century wildfire suppression and land management policies have promoted biomass accumulations in some ecosystems in the western United States where wildfire is a natural and necessary element. These changes have fueled large, stand-replacing crown fires in southwestern ponderosa pine forests, where they were rare under...

Author(s): Anthony L. Westerling, Thomas W. Swetnam

Year Published: 2003

Type: Document

Book or Chapter or Journal Article, Synthesis

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

[www.nrfirescience.org/resource/8140](http://www.nrfirescience.org/resource/8140)

Topography, vegetation, and climate act together to determine the spatial patterns of fires at landscape scales. Knowledge of landscape-fire-climate relations at these broad scales (1,000s ha to 100,000s ha) is limited and is largely based on inferences and extrapolations from fire histories reconstructed from finer scales. In this...

Author(s): Matthew G. Rollins, Penelope Morgan

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

### **Fire as a coarse filter for snags and logs**

[www.nrfirescience.org/resource/11075](http://www.nrfirescience.org/resource/11075)

Fire played an important role in maintaining and creating conditions suitable for native flora and fauna in the forests of western North America. Recent coarse filter conservation strategies have advocated creating future landscapes that incorporate historic or natural ranges of variability, including fire regimes. Historic fire...

Author(s): James K. Agee

Year Published: 2002

Type: Document

Conference Proceedings, Technical Report or White Paper

### **Water use by whitebark pine and subalpine fir: potential consequences of fire exclusion in the Northern Rocky Mountains**

[www.nrfirescience.org/resource/8146](http://www.nrfirescience.org/resource/8146)

In subalpine forests of the northern Rocky Mountains, fire exclusion has contributed to large-scale shifts from early-successional whitebark pine (*Pinus albicaulis* Engelm.) to late-successional subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.), a species assumed to be more shade tolerant than whitebark pine and with leaf to sapwood...

Author(s): Anna Sala, Elieen V. Carey, Robert E. Keane, Ragan M. Callaway

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

### **Evaluating a century of fire patterns in two Rocky Mountain wilderness areas using digital fire atlases**

[www.nrfirescience.org/resource/8139](http://www.nrfirescience.org/resource/8139)

Changes in fire size, shape, and frequency under different fire-management strategies were evaluated using time series of fire perimeter data (fire atlases) and mapped potential vegetation types (PVTs) in the Gila-Aldo Leopold Wilderness Complex (GALWC) in New Mexico and the Selway-Bitterroot Wilderness Complex (SBWC) in Idaho and...

Author(s): Matthew G. Rollins, Thomas W. Swetnam, Penelope Morgan

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

### **Uncertainty in surface-fire history: the case of ponderosa pine forests in the western United States**

[www.nrfirescience.org/resource/8257](http://www.nrfirescience.org/resource/8257)

Present understanding of fire ecology in forests subject to surface fires is based on fire-scar evidence. We present theory and empirical results that suggest that fire-history data have uncertainties and biases when used to estimate the population mean fire interval (FI) or other parameters of the fire regime. First, the population...

Author(s): William L. Baker, Donna S. Ehle

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

### **The role of fire in juniper and pinyon woodlands: a descriptive analysis**

[www.nrfirescience.org/resource/10994](http://www.nrfirescience.org/resource/10994)

Among the most pronounced vegetation changes in past 130 years has been the increase in both distribution and density of juniper (*Juniperus* spp.) and pinyon (*Pinus* spp.) across the Intermountain West. Juniper and pinyon species between the Canadian and Mexican borders occupy over 30 million ha throughout this region. Prior to...

Author(s): Richard F. Miller, Robin J. Tausch

Year Published: 2001

Type: Document

Conference Proceedings

### **Native burning in western North America: implications for hardwood forest management**

[www.nrfirescience.org/resource/11062](http://www.nrfirescience.org/resource/11062)

It is now widely acknowledged that frequent low-intensity fires once structured many western forests. What is not generally recognized, however, is that most of those fires were purposefully set by native people, not started by lightning. Data from the Rocky Mountains attest to the widespread use of fire by native people, as does...

Author(s): Charles E. Kay

Year Published: 2000

Type: Document

Conference Proceedings

### **Interactions between fire, grazing, and climate change at Wind Cave National Park, SD**

[www.nrfirescience.org/resource/7909](http://www.nrfirescience.org/resource/7909)

Projected changes in global climate have important ramifications for the future of national parks and other reserves set aside to conserve ecological uniqueness. We explored potential implications of climatic changes on lifeform distribution and growth at Wind Cave National Park (WCNP), South

Dakota, which lies on a climatically...

Author(s): Dominique Bachelet, James M. Lenihan, Christopher Daly, Ronald P. Neilson

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Associated riparian communities**

[www.nrfirescience.org/resource/10962](http://www.nrfirescience.org/resource/10962)

Some 100 years of fire exclusion in the Interior Northwest has resulted in riparian areas dominated by dense thickets of shade-tolerant trees. If former, more open conditions could be restored, these habitats could once more support a more diverse bird community. Efforts toward this at two study sites are described.

Author(s): Colin C. Hardy, Robert E. Keane, Michael G. Harrington

Year Published: 2000

Type: Document

Conference Proceedings

### **Influence of fire on native nitrogen-fixing plants and soil nitrogen status in ponderosa pine-Douglas-fir forests in western Montana**

[www.nrfirescience.org/resource/8258](http://www.nrfirescience.org/resource/8258)

Nitrogen fixing plants have been reported to play an important role in replacing N lost from soil in fire dominated ecosystems. Exclusion of fire from ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.)-Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) forests of western Montana has led to widespread changes in forest structure,...

Author(s): J. A. Newland, Thomas H. DeLuca

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Twentieth-century fire patterns in the Selway-Bitterroot Wilderness Area, Idaho/ Montana, and the Gila/Aldo Leopold Wilderness Complex, New Mexico**

[www.nrfirescience.org/resource/11001](http://www.nrfirescience.org/resource/11001)

Twentieth century fire patterns were analyzed for two large, disparate wilderness areas in the Rocky Mountains. Spatial and temporal patterns of fires were represented as GIS-based digital fire atlases compiled from archival Forest Service data. We find that spatial and temporal fire patterns are related to landscape features and...

Author(s): Matthew G. Rollins, Thomas W. Swetnam, Penelope Morgan

Year Published: 2000

Type: Document

Conference Proceedings

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

[www.nrfirescience.org/resource/7965](http://www.nrfirescience.org/resource/7965)

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

Author(s): Michael P. Murray, Stephen C. Bunting, Michael P. Murray

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Fire in western shrubland, woodland, and grassland ecosystems**

[www.nrfirescience.org/resource/11116](http://www.nrfirescience.org/resource/11116)

This state-of-knowledge review about the effects of fire on flora and fuels can assist land managers with ecosystem and fire management planning and in their efforts to inform others about the ecological role of fire. Chapter topics include fire regime classification, autecological effects of fire, fire regime characteristics and...

Author(s): Timothy E. Paysen, R. James Ansley, James K. Brown, Gerald J. Gottfried, Sally M. Haase, Michael G. Harrington, Marcia G. Narog, Stephen S. Sackett, Ruth C. Wilson

Year Published: 2000

Type: Document

Synthesis, Technical Report or White Paper

### **Variations in fire frequency and climate over the last 17,000 years in central Yellowstone National Park**

[www.nrfirescience.org/resource/13533](http://www.nrfirescience.org/resource/13533)

A 17000 yr fire history from Yellowstone National Park demonstrates a strong link between changes in climate and variations in fire frequency on millennial time scales. The fire history reconstruction is based on a detailed charcoal stratigraphy from Cygnet Lake in the rhyolite plateau region. Macroscopic charcoal particles were...

Author(s): Sarah H. Millspaugh, Cathy L. Whitlock, Patrick J. Bartlein

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

### **Fire, competition, and forest pests: landscape treatment to sustain ecosystem function**

[www.nrfirescience.org/resource/10988](http://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

### **Fire in western forest ecosystems**

[www.nrfirescience.org/resource/11115](http://www.nrfirescience.org/resource/11115)

Description not entered

Author(s): Stephen F. Arno

Year Published: 2000

Type: Document

Technical Report or White Paper

### **Fire history of an isolated subalpine mountain range of the intermountain region, United States**

[www.nrfirescience.org/resource/11438](http://www.nrfirescience.org/resource/11438)

Fire has historically been an important ecological component of forests in the Intermountain Region of the northwestern United States. This study is set in a small biogeographically disjunct mountain range. Our research objectives were to (1) investigate the historical frequency, severity, size, and spatial

pattern of fire; (2)...

Author(s): Michael P. Murray, Stephen C. Bunting, Penelope Morgan

Year Published: 1998

Type: Document

Book or Chapter or Journal Article

### **Old-growth ponderosa pine and western larch stand structures: influences of pre-1900 fires and fire exclusion**

[www.nrfirescience.org/resource/11967](http://www.nrfirescience.org/resource/11967)

Presents detailed age structure for two western larch stands that historically experienced frequent fires. Compares age structures of eleven ponderosa pine and western larch stands representing a broad range of sites that had frequent fires. Interprets causal factors possibly linked to variations in stand age structures.

Author(s): Stephen F. Arno, Helen Y. Smith, Michael A. Krebs

Year Published: 1997

Type: Document

Technical Report or White Paper

### **Restoring fire in lodgepole pine forests of the Intermountain West**

[www.nrfirescience.org/resource/8347](http://www.nrfirescience.org/resource/8347)

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

Author(s): Colin C. Hardy, Ward W. McCaughey

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

### **Reestablishing fire-adapted communities to riparian forests in the ponderosa pine zone**

[www.nrfirescience.org/resource/11248](http://www.nrfirescience.org/resource/11248)

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

Author(s): Matthew K. Arno

Year Published: 1996

Type: Document

Technical Report or White Paper

### **Restoring recreational and residential forests**

[www.nrfirescience.org/resource/11249](http://www.nrfirescience.org/resource/11249)

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

Author(s): Joe H. Scott

Year Published: 1996

Type: Document

Technical Report or White Paper

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

[www.nrfirescience.org/resource/11245](http://www.nrfirescience.org/resource/11245)

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

Author(s): Stephen F. Arno

Year Published: 1996

Type: Document

Technical Report or White Paper

### **Comparing the prescribed natural fire program with presettlement fires in the Selway-Bitterroot Wilderness**

[www.nrfirescience.org/resource/8217](http://www.nrfirescience.org/resource/8217)

The severity and extent of recent fires (1979-1990) were compared with that of presettlement fires (pre-1935) by eight major forest types in the Selway-Bitterroot Wilderness (SBW) in Idaho and Montana. Presettlement fire intervals were determined for estimating area burned. Presettlement annual area burned for the entire SBW was 4,...

Author(s): James K. Brown, Stephen F. Arno, Stephen W. Barrett, James P. Menakis

Year Published: 1994

Type: Document

Book or Chapter or Journal Article

### **Fire history of Tenderfoot Creek Experimental Forest Lewis and Clark National Forest**

[www.nrfirescience.org/resource/13158](http://www.nrfirescience.org/resource/13158)

The landscape and stand-level fire history of lodgepole pine dominated forest in Tenderfoot Creek Experimental Forest is assessed. Primary objective were to: 1) determine pre-1900 fire periodicities, severities, and burning patterns in the area's lodgepole pine dominated stands, and 2) document and map the forest age class mosaic,...

Author(s): Stephen W. Barrett

Year Published: 1993

Type: Document

Technical Report or White Paper

### **Forest fire frequency and western spruce budworm outbreaks in western Montana**

[www.nrfirescience.org/resource/7908](http://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

### **Fire, logging, and white-tailed deer interrelationships in the Swan Valley, northwestern Montana**

[www.nrfirescience.org/resource/11056](http://www.nrfirescience.org/resource/11056)

The historical importance of fire was investigated on the upper Swan Valley winter white-tailed deer range in northwestern Montana. The relatively recent impacts of logging on winter range quality were also included in these studies. Fire exclusion has led to successional development of once open-

canopied mature seral forests, and...

Author(s): June D. Freedman, James R. Habeck

Year Published: 1985

Type: Document

Conference Proceedings, Technical Report or White Paper

### **Fire frequency reduced two orders of magnitude in the Bitterroot Canyons, Montana**

[www.nrfirescience.org/resource/8231](http://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*...

Author(s): Bruce McCune

Year Published: 1983

Type: Document

Book or Chapter or Journal Article

### **Indian fires as an ecological influence in the Northern Rockies**

[www.nrfirescience.org/resource/7910](http://www.nrfirescience.org/resource/7910)

The importance of fire as an ecological disturbance in the Northern Rockies is well accepted. Lightning is generally thought to have been the main source of ignition prior to settlement by Europeans. But writings of explorers and pioneers mention deliberate burning by Indians frequently enough to warrant an investigation of its...

Author(s): Stephen W. Barrett, Stephen F. Arno

Year Published: 1982

Type: Document

Book or Chapter or Journal Article

### **Variation in estimates of fire intervals: a closer look at fire history on the Bitterroot National Forest**

[www.nrfirescience.org/resource/11958](http://www.nrfirescience.org/resource/11958)

The authors examine variation in the length of mean intervals between fires (occurring between the years 1600 and 1910) in sample units of various sizes, ranging from a point on the ground (single tree) to a large stand (200 to 800 acres; 80 to 320 hectares). Recommendations are made regarding appropriate sizes of sample units for...

Author(s): Stephen F. Arno, Terry D. Petersen

Year Published: 1982

Type: Document

Technical Report or White Paper

### **Fire intensity and frequency as factors in the distribution and structure of northern ecosystems**

[www.nrfirescience.org/resource/8406](http://www.nrfirescience.org/resource/8406)

Most presettlement Canadian and Alaskan boreal forests and Rocky Mountain subalpine forests had lightning fire regimes of large-scale crown fires and high-intensity surface fires, causing total stand replacement on fire rotations (or cycles) to 50 to 200 years. Cycles and fire size varied with latitude, elevation, and topographic...

Author(s): Miron L. Heinselman

Year Published: 1981

Type: Document

Conference Proceedings

### **Forest fire history in the Northern Rockies**

[www.nrfirescience.org/resource/13121](http://www.nrfirescience.org/resource/13121)

Recent fire-scar studies in the northern Rocky Mountains have documented forest fire history over the past few centuries. They reveal that in some forest types fire maintained many-aged open stands of seral trees. In other types, major fires caused replacement of the stands. Often, however, fires burned at variable intensities,...

Author(s): Stephen F. Arno

Year Published: 1980

Type: Document

Book or Chapter or Journal Article

### **The dendrochronology of fire history**

[www.nrfirescience.org/resource/12411](http://www.nrfirescience.org/resource/12411)

Dendrochronology, the study of annual rings in woody plants, has developed into a useful tool for a number of different fields of study. Based on the interaction of trees and the climate, it is possible to use tree-rings as proxy data in reconstruction of past climates and river runoff. It has been a dating tool of archaeologists....

Author(s): Marvin A. Stokes

Year Published: 1980

Type: Document

Conference Proceedings, Technical Report or White Paper

### **Indian fires in the pre-settlement forests of western Montana**

[www.nrfirescience.org/resource/12043](http://www.nrfirescience.org/resource/12043)

Presents preliminary results of a two-year study examining the pattern of Indian fires in western Montana's lower elevation forests. Interviews and historic journals were used to reconstruct the characteristics of aboriginal burning. Fire scar data from paired stands indicate substantial differences in fire frequency between Indian...

Author(s): Stephen W. Berrett

Year Published: 1980

Type: Document

Conference Proceedings

### **Fire frequency in subalpine forests of Yellowstone National Park**

[www.nrfirescience.org/resource/12042](http://www.nrfirescience.org/resource/12042)

Dead woody fuels were sampled in 16 upland forest stands representing a chronosequence of forest successional stages. Different fuel components show different temporal patterns, but adequate levels of all components necessary for an intense crown fire are not present simultaneously until stand age 300-400 yr. Therefore, the average...

Author(s): William H. Romme

Year Published: 1980

Type: Document

Conference Proceedings, Technical Report or White Paper

### **Fire history terminology: report of the ad hoc committee**

[www.nrfirescience.org/resource/12410](http://www.nrfirescience.org/resource/12410)

It is often quite difficult to compare fire history studies conducted by different investigators because different terms may be used to refer to the same concept and the same term may be used to refer to different concepts. To help resolve this difficulty, an ad hoc committee was formed early in the course of the workshop with the...

Author(s): William H. Romme  
Year Published: 1980  
Type: Document  
Conference Proceedings, Technical Report or White Paper

### **Fire history of western redcedar/hemlock forests in northern Idaho**

[www.nrfirescience.org/resource/12041](http://www.nrfirescience.org/resource/12041)

Evidence of fire history over the past few centuries was gathered in two areas (totaling 30,000 acres; 6000 ha) for fire management planning. Findings are some of the first detailed data for western redcedar-hemlock forests. On upland habitat types fires of variable intensities generally occurred at 50-to-150-year intervals, often...

Author(s): Stephen F. Arno, Dan H. Davis  
Year Published: 1980  
Type: Document  
Conference Proceedings, Technical Report or White Paper

### **Fire history of a western larch/Douglas-fir forest type in northwestern Montana**

[www.nrfirescience.org/resource/12044](http://www.nrfirescience.org/resource/12044)

Mean frequencies were about 120 years for valleys and montane slopes and 150 years for subalpine slopes in this western larch/Douglas-fir forest from 1735 to 1976. Fires were small and moderately intense with occasional high intensity runs. Single burns thinned the overstory favoring mixed conifer regeneration. Multiple burns...

Author(s): Kathleen M. Davis  
Year Published: 1980  
Type: Document  
Conference Proceedings, Technical Report or White Paper

### **The role and use of fire in sagebrush-grass and pinyon-juniper plant communities: a state-of-the-art review**

[www.nrfirescience.org/resource/11908](http://www.nrfirescience.org/resource/11908)

Fire frequencies averaged 32 to 70 years in sagebrush-grass communities. Early spring and late fall fires are the least harmful to perennial grasses, although small plants and those with coarse stems are more tolerant of fire than large plants and those with leafy stems. Cheatgrass can be suppressed by burning in early summer, but...

Author(s): Henry A. Wright, Leon F. Neuenschwander, Carlton M. Britton  
Year Published: 1979  
Type: Document  
Synthesis, Technical Report or White Paper

### **The fire history of Coram Experimental Forest**

[www.nrfirescience.org/resource/13148](http://www.nrfirescience.org/resource/13148)

This thesis documents the fire history and assesses the role of fire in the western larch/Douglas-fir forest of the Coram Experimental Forest in northwestern Montana. Primary attention was given to the frequency, areal spread, relative severity, and effects of fires prior to the advent of active suppression efforts in order to...

Author(s): Kathy M. Sneck  
Year Published: 1977  
Type: Document  
Dissertation or Thesis

### **A method for determining fire history in coniferous forests in the Mountain West**

[www.nrfirescience.org/resource/11176](http://www.nrfirescience.org/resource/11176)

An improved version is presented of a method previously used [see FA 40, 169]. Instructions are given for: laying out transects; gathering stand data, including documenting fire-scarred trees; sampling fire-scarred trees; laboratory analysis of tree cross-sections; correlating fire chronologies; and calculating fire frequency. The...

Author(s): Stephen F. Arno, Kathy M. Sneck

Year Published: 1977

Type: Document

Technical Report or White Paper

### **The historical role of fire on the Bitterroot National Forest**

[www.nrfirescience.org/resource/11175](http://www.nrfirescience.org/resource/11175)

Presents frequencies, intensities, and influences of fire on stand structure and composition on the Bitterroot National Forest in west-central Montana. Three study areas were established, each having a wide range of elevations and forest types. Findings are based upon study of nearly 900 individual fire scars on living trees, and on...

Author(s): Stephen F. Arno

Year Published: 1976

Type: Document

Technical Report or White Paper

### **Fire-dependent forests in the Northern Rocky Mountains**

[www.nrfirescience.org/resource/7935](http://www.nrfirescience.org/resource/7935)

One objective of wilderness and parkland fire ecology research is to describe the relationships between fire and unmanaged ecosystems, so that strategies can be determined that will provide a more nearly natural incidence of fire. More than 50 years of efforts directed toward exclusion of wildland fires in the Northern Rocky...

Author(s): James R. Habeck, Robert W. Mutch

Year Published: 1973

Type: Document

Book or Chapter or Journal Article

### **Wildfires in northern Yellowstone National Park**

[www.nrfirescience.org/resource/15398](http://www.nrfirescience.org/resource/15398)

A sample of 40 fire-scarred trees was used to reconstruct the frequency and size of fires during the past 300-400 years in northern Yellowstone National Park. Best estimates of frequency suggested mean intervals of about 20-25 years between fires, after adjustments had been made for the recent influence of modern man. Agreement in...

Author(s): Douglas B. Houston

Year Published: 1973

Type: Document

Book or Chapter or Journal Article