

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

Wildland fire reburning trends across the US West suggest only short-term negative feedback and differing climatic effects

www.nrfirescience.org/resource/20940

Wildfires are a significant agent of disturbance in forests and highly sensitive to climate change. Short-interval fires and high severity (mortality-causing) fires in particular, may catalyze rapid and substantial ecosystem shifts by eliminating woody species and triggering conversions from forest to shrub or grassland ecosystems....

Author(s): Brian Buma, Shelby A. Weiss, Kathy Geier-Hayes, Melissa S. Lucash

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Biotic and anthropogenic forces rival climatic/abiotic factors in determining global plant population growth and fitness

www.nrfirescience.org/resource/20734

Multiple, simultaneous environmental changes, in climatic/abiotic factors, interacting species, and direct human influences, are impacting natural populations and thus biodiversity, ecosystem services, and evolutionary trajectories. Determining whether the magnitudes of the population impacts of abiotic, biotic, and anthropogenic...

Author(s): William F. Morris, Johan Ehrlén, Johan P. Dahlgren, Alexander K. Loomis, Allison M. Louthan

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Warmer and drier fire seasons contribute to increases in area burned at high severity in western US forests from 1985-2017

www.nrfirescience.org/resource/22059

Increases in burned area across the western US since the mid-1980's have been widely documented and linked partially to climate factors, yet evaluations of trends in fire severity are lacking. Here, we evaluate fire severity trends and their interannual relationships to climate for western US forests from 1985-2017....

Author(s): Sean A. Parks, John T. Abatzoglou

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Focus on changing fire regimes: interactions with climate, ecosystems, and society

www.nrfirescience.org/resource/20808

Fire is a complex Earth system phenomenon that fundamentally affects vegetation distributions, biogeochemical cycling, climate, and human society across most of Earth's land surface. Fire regimes are currently changing due to multiple interacting global change drivers, most notably climate change, land use, and direct human...

Author(s): Brendan M. Rogers, Jennifer Balch, Scott J. Goetz, Caroline E. R. Lehmann, Merritt R. Turetsky

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

The species diversity × fire severity relationship is hump-shaped in semiarid yellow pine and mixed conifer forests

www.nrfirescience.org/resource/20255

The combination of direct human influences and the effects of climate change are resulting in altered ecological disturbance regimes, and this is especially the case for wildfires. Many regions that historically experienced low–moderate severity fire regimes are seeing increased area burned at high severity as a result of...

Author(s): Clark Richter, Marcel Rejmánek, Jesse E. D. Miller, Kevin R. Welch, Jonah Maria Weeks, Hugh Safford

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Response of simulated burned area to historical changes in environmental and anthropogenic factors: a comparison of seven fire models

www.nrfirescience.org/resource/20293

Understanding how fire regimes change over time is of major importance for understanding their future impact on the Earth system, including society. Large differences in simulated burned area between fire models show that there is substantial uncertainty associated with modelling global change impacts on fire regimes. We draw here...

Author(s): Lina Teckentrup, Stijn Hantson, Angelika Heil, Joe R. Melton, Matthew Forrest, Fang Li, Chao Yue, Almut Arneith, Thomas Hickler, Stephen Sitch, Gitta Lasslop

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Scientists' warning on wildfire — a Canadian perspective

www.nrfirescience.org/resource/20118

Recently, the World Scientists' Warning to Humanity: a Second Notice was issued in response to ongoing and largely unabated environmental degradation due to anthropogenic activities. In the warning, humanity is urged to practice more environmentally sustainable alternatives to business as usual to avoid potentially catastrophic...

Author(s): Sean C. P. Coogan, Francois-Nicolas Robinne, Piyush Jain, Michael D. Flannigan

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

A landscape model of variable social-ecological fire regimes

www.nrfirescience.org/resource/21250

Fire regimes are now recognized as the product of social processes whereby fire on any landscape is the product of human-generated drivers: climate change, historical patterns of vegetation manipulation,

invasive species, active fire suppression, ongoing fuel management efforts, prescribed burning, and accidental ignitions. We...

Author(s): Robert M. Scheller, Alec Kretchun, Todd J. Hawbaker, Paul D. Henne

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Systematic review and meta-analysis of fire regime research in ponderosa pine (*Pinus ponderosa*) ecosystems, Colorado, USA

www.nrfirescience.org/resource/20356

Background: 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 a plethora of research exists characterizing various fire regime parameters, although often only one or two parameters are...

Author(s): Shawn T. McKinney

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Large-scale restoration increases carbon stability under projected climate and wildfire regimes

www.nrfirescience.org/resource/17573

Changing climate and increasing area burned pose a challenge to forest carbon (C) storage, which is compounded by an elevated risk of high-severity wildfire due to long-term fire suppression in the western US. Restoration treatments that reduce tree density and reintroduce surface fire are effective at moderating fire effects...

Author(s): Shuang Liang, Matthew D. Hurteau, Anthony L. Westerling

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

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...

Author(s): Sally Archibald, Caroline E. R. Lehmann, Claire M. Belcher, William J. Bond, Ross A.

Bradstock, Anne Laure Daniiau, K. G. Dexter, Elisabeth J. Forrestel, M. Greve, Tianhua He, Steven I.

Higgins, William A. Hoffmann, Byron B. Lamont, D. J. McGlenn, G. R. Moncrieff, Colin P. Osborne, Juli

G. Pausas, Owen F. Price, Brad S. Ripley, Brendan M. Rogers, Dylan W. Schwilk, M. F. Simon, Merritt

R. Turetsky, Guido R. Van der Werf, Amy E. Zanne

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

Effect of topography on persistent fire refugia of the Canadian Rocky Mountains

www.nrfirescience.org/resource/17772

Persistent fire refugia, which are forest stands that have survived multiple fires, play an important ecological role in the resilience of mountainous forest ecosystems following disturbances. The loss of numerous refugia patches to large, high-severity fires in recent years is prompting the need to better understand drivers of fire...

Author(s): Marie-Pierre Rogeau, Quinn E. Barber, Marc-Andre Parisien

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Effects of climate change and climate-altered fire regimes on whitebark pine populations - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17562

As climate change alters global fire regimes, fire and forest managers must prioritize management actions that simultaneously protect sensitive resources and allow fire to maintain its ecological role. Over the last twenty years, this task has become more difficult, as increased fire severity and season length have caused...

Author(s): Diana F. Tomback, Elizabeth R. Pansing

Year Published: 2018

Type: Document

Technical Report or White Paper

The nature of the beast: examining climate adaptation options in forests with stand-replacing fire regimes

www.nrfirescience.org/resource/17221

Building resilience to natural disturbances is a key to managing forests for adaptation to climate change. To date, most climate adaptation guidance has focused on recommendations for frequent-fire forests, leaving few published guidelines for forests that naturally experience infrequent, stand-replacing wildfires. Because most...

Author(s): Joshua S. Halofsky, Daniel C. Donato, Jerry F. Franklin, Jessica E. Halofsky, David L. Peterson, Brian J. Harvey

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Analog-based fire regime and vegetation shifts in mountainous regions of the western US

www.nrfirescience.org/resource/17773

Climate change is expected to result in substantial ecological impacts across the globe. These impacts are uncertain but there is strong consensus that they will almost certainly affect fire regimes and vegetation. In this study, we evaluated how climate change may influence fire frequency, fire severity, and broad classes of...

Author(s): Sean A. Parks, Lisa M. Holsinger, Carol Miller, Marc-Andre Parisien

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Potential Climate Feedbacks of Changing Fire regimes in the U.S.: A review - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17024

Wildland fire is a disturbance that can profoundly impact the environment and human health and welfare. While climate is generally a critical driving factor shaping the occurrence and impacts of fire, fire can also play a role in shaping climate. With an increasing trend in wildland fire occurrence and extent, it is important to...

Author(s): Anping Chen, Richard A. Birdsey

Year Published: 2017

Type: Document

Synthesis

Analog-based fire regime and vegetation shifts in mountainous regions of the western US

www.nrfirescience.org/resource/15521

Climate change is expected to result in substantial ecological impacts across the globe. These impacts are uncertain but there is strong consensus that they will almost certainly affect fire regimes and vegetation. In this study, we evaluated how climate change may influence fire frequency, fire severity, and broad classes of...

Author(s): Sean A. Parks, Lisa M. Holsinger, Carol Miller, Marc-Andre Parisien

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Topographic and fire weather controls of contemporary fire refugia in forested ecosystems of northwestern North America

www.nrfirescience.org/resource/18922

Fire refugia, sometimes referred to as fire islands, shadows, skips, residuals, or fire remnants, are an important element of the burn mosaic, but we lack a quantitative framework that links observations of fire refugia from different environmental contexts. Here, we develop and test a conceptual model for how predictability of fire...

Author(s): Meg A. Krawchuk, Sandra L. Haire, Jonathan D. Coop, Marc-Andre Parisien, Ellen Whitman, Geneva W. Chong, Carol Miller

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Identification of Fire Refugia in Rocky Mountain Ecosystems of the U.S. and Canada: Development and Application of the Refugium Concept for Biodiversity Conservation over Large Spatial and Temporal Scales

www.nrfirescience.org/resource/18923

The purpose of this report is to provide a summary of findings and products from our FY2014 research project on fire refugia. We summarize the products and findings of our work, including: development of regional datasets; use of a climate space framework to select sample fires; development of fire refugia models across the climate...

Author(s): Geneva W. Chong

Year Published: 2015

Type: Document

Technical Report or White Paper

The climate space of fire regimes in north-western North America

www.nrfirescience.org/resource/18921

Aim: Studies of fire activity along environmental gradients have been undertaken, but the results of such studies have yet to be integrated with fire-regime analysis. We characterize fire-regime components along climate gradients and a gradient of human influence. Location: We focus on a climatically diverse region of north-western...

Author(s): Ellen Whitman, E. Batllori, Marc-Andre Parisien, Carol Miller, Jonathan D. Coop, Meg A. Krawchuk, Geneva W. Chong, Sandra L. Haire

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Impacts of changing fire regimes in the alpine treeline ecotone

www.nrfirescience.org/resource/15577

We studied the effects of a shift in the fire regime of an ecosystem that is very sensitive to climate change: the ecotone from closed forest to open alpine tundra, hereafter the alpine treeline ecotone (ATE). Results suggest that ATEs will become more complex spatially in a warming climate, rather than moving up or down en masse....

Author(s): Donald McKenzie, C. Alina Cansler

Year Published: 2015

Type: Document

Technical Report or White Paper

Climate change impacts on fire regimes and key ecosystem services in Rocky Mountain forests

www.nrfirescience.org/resource/16832

Forests and woodlands in the central Rocky Mountains span broad gradients in climate, elevation, and other environmental conditions, and therefore encompass a great diversity of species, ecosystem productivities, and fire regimes. The objectives of this review are: (1) to characterize the likely short- and longer-term effects of...

Author(s): Monique E. Rocca, Peter M. Brown, Lee H. MacDonald, Christian M. Carrico

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Continued warming could transform Greater Yellowstone fire regimes by mid-21st century

www.nrfirescience.org/resource/8358

Climate change is likely to alter wildfire regimes, but the magnitude and timing of potential climate-driven changes in regional fire regimes are not well understood. We considered how the occurrence, size, and spatial location of large fires might respond to climate projections in the Greater Yellowstone ecosystem (GYE) (Wyoming),...

Author(s): Anthony L. Westerling, Monica G. Turner, Erica A. H. Smithwick, William H. Romme, Michael G. Ryan

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

The role of climate and vegetation change in shaping past and future fire regimes in the northwestern U.S. and the implications for ecosystem management

www.nrfirescience.org/resource/8382

Fire is an important part of the disturbance regimes of northwestern US forests and its role in

maintaining and altering forest vegetation is evident in the paleoecological record of the region. Long-term reconstructions of Holocene fire regimes, provided by the analysis of charcoal, pollen, and other fire proxies in a network of...

Author(s): Cathy L. Whitlock, Sarah L. Shafer, Jennifer R. Marlon

Year Published: 2003

Type: Document

Book or Chapter or Journal Article