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

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

The species diversity x 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, JonahMaria Weeks, Hugh Safford
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

Response of simulated burned area to historical changes in environmental and anthropogenic factors: a comparison of seven fire models
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 Arneth, Thomas Hickler, Stephen Sitch, Gitta Lasslop

Year Published: 2019
Type: Document
Book or Chapter or Journal Article

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

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

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...


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

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
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

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

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...
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...

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...

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...

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...
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
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