Variable forest structure and fire reconstructed across historical ponderosa pine and mixed conifer landscapes of the San Juan Mountains, Colorado

www.nrfirescience.org/resource/20677

Late-1800s land surveys were used to reconstruct historical forest structure and fire over more than 235,000 ha in ponderosa pine and mixed conifer landscapes of the San Juan Mountains, Colorado, to further understand differences among regional mountain ranges and help guide landscape-scale restoration and management. Historically,...

Author(s): William L. Baker
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Restoration of Sagebrush in Crested Wheatgrass Communities: Longer-Term Evaluation in Northern Great Basin

www.nrfirescience.org/resource/20743

Crested wheatgrass (Agropyron cristatum [L] Gaertm. and Agropyron desertorum [Fisch.] Schult.), an introduced bunchgrass, has been seeded on millions of hectares of sagebrush steppe. It can establish near-monocultures; therefore, reestablishing native vegetation in these communities is often a restoration goal. Efforts to restore...

Author(s): Kirk W. Davies, Chad S. Boyd, Jonathan D. Bates, Erik P. Hamerlynck, Stella M. Copeland
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Protected area stewardship in the Anthropocene: integrating science, law, and ethics to evaluate proposals for ecological restoration in wilderness

www.nrfirescience.org/resource/20756

ePDFPDF PDF ?Tools ?Share Abstract Every year, the four federal agencies that manage designated wilderness in the United States receive proposals to implement small- and large-scale ecological restorations within the National Wilderness Preservation System. The combination of climate change with other landscape stressors is...

Author(s): Peter Landres, Beth Hahn, Eric Biber, Daniel T. Spencer
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Is fire “for the birds”? How two rare species influence fire management across the US

www.nrfirescience.org/resource/20125

The US Endangered Species Act has enabled species conservation but has differentially impacted fire management and rare bird conservation in the southern and western US. In the South, prescribed fire and restoration-based forest thinning are commonly used to conserve the endangered red-cockaded woodpecker (Picoides borealis; RCW...

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

Science framework for conservation and restoration of the sagebrush biome: Linking the
www.nrfirescience.org/resource/19523
The Science Framework is intended to link the Department of the Interior’s Integrated Rangeland Fire Management Strategy with long-term strategic conservation and restoration actions in the sagebrush biome. The focus is on sagebrush (Artemisia spp.) ecosystems and sagebrush dependent species with an emphasis on Greater sage-grouse...
Author(s): Michele R. Crist, Jeanne C. Chambers, Susan L. Phillips, Karen L. Prentice, Lief A. Wiechman
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Coupling wildfire spread and erosion models to quantify post-fire erosion before and after fuel treatments
www.nrfirescience.org/resource/20106
Wildfires are known to change post-fire watershed conditions such that hillslopes can become prone to increased erosion and sediment delivery. In this work, we coupled wildfire spread and erosion prediction modelling to assess the benefits of fuel reduction treatments in preventing soil runoff. The study was conducted in a 68,000-ha...
Author(s): Michele Salis, Liliana Del Giudice, Peter R. Robichaud, Alan A. Ager, Annalisa Canu, Pierpaolo Duce, Grazia Pellizzaro, Andrea Ventura, Fermin Alcasena-Urdioz, Donatella Spano, Bachisio Arca
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Post-fire wood mulch for reducing erosion potential increases tree seedlings with few impacts on understory plants and soil nitrogen
www.nrfirescience.org/resource/20585
Following high-severity wildfire, application of mulch on the soil surface is commonly used to stabilize slopes and limit soil erosion potential, protecting ecosystem values at risk. Despite the widespread use of mulch, relatively little is known about its effects on ecosystem recovery and soil processes important for plant re-...
Author(s): Jayne L. Jonas, Erin Berryman, Brett Wolk, Penelope Morgan, Peter R. Robichaud
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Effect of moss crusts on mitigation of post-fire soil erosion
www.nrfirescience.org/resource/19387
Mosses and wildfires are ubiquitous occurrences. Their correlation has been assessed in few studies. Mosses have been pointed as pioneer species in post-fire environments. However, reasons for moss crusting in post-wildfire soils and their ecosystem role in preventing soil erosion have not been quantitatively assessed. Moss crusts...
Author(s): Flávio C. Silva, Diana C.S. Vieira, Els van der Spek, J. Jacob Keizer
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Alternative stable equilibria and critical thresholds created by fire regimes and plant responses
Wildfire is a dominant disturbance in many ecosystems, and fire frequency and intensity are being altered as climates change. Through effects on mortality and regeneration, fire affects plant community composition, species richness, and carbon cycling. In some regions, changes to fire regimes could result in critical, non-...

Author(s): Adam D. Miller, Jonathan R. Thompson, Alan J. Tepley, Kristina J. Anderson?Teixeira
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Whitebark pine (Pinus albicaulis) forests have been declining throughout their range in Western North America from the combined effects of mountain pine beetle (Dendroctonus ponderosae) outbreaks, fire exclusion policies, and the exotic disease white pine blister rust. Projected warming and drying trends in climate may exacerbate...

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

As more of the western US burns in large wildfires it is critical to managers and scientists to understand how these landscapes recovery post-fire. Tree regeneration in high severity burned landscapes determines if and how these landscapes become forested again, while changes in fuels structure influences how these landscapes may...

Author(s): Penelope Morgan, Camille Stevens-Rumann, Kerry Kemp, Jarod Blades
Year Published: 2019
Type: Document
Technical Report or White Paper

Context: Lack of quantitative observations of extent, frequency, and severity of large historical fires constrains awareness of departure of contemporary conditions from those that demonstrated resistance and resilience to frequent fire and recurring drought. Objectives: Compare historical and contemporary fire and forest...

Author(s): R. Keala Hagmann, Andrew G. Merschel, Matthew J. Reilly
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Species distribution models (SDMs) that rely on regional?scale environmental variables will play a key role in forecasting species occurrence in the face of climate change. However, in the Anthropocene, a number of local?scale anthropogenic variables, including wildfire history, land?use change, invasive...
Vegetation succession in an old-growth ponderosa pine forest following structural restoration with fire: implications for retreatment and maintenance - JFSP Final Report
www.nrfirescience.org/resource/19272
Stand changes brought on by fire exclusion have contributed to reduced resilience to wildfire in ponderosa pine forests throughout the western US. Growing recognition of how structural attributes influence resilience has led to interest in restoring more heterogeneous conditions once common in these forests, but key information...
Author(s): Eric E. Knapp, Alan H. Taylor, Michelle Coppoletta, Natalie Pawlikowski
Year Published: 2019
Type: Document
Technical Report or White Paper

Fire regime and ecosystem responses: adaptive forest management in a changing world (Part 2)
www.nrfirescience.org/resource/19869
Fire is an ecological factor in ecosystems around the world, made increasingly more critical by unprecedented shifts in climate and human population pressure. The knowledge gradually acquired on the subject is needed to improve fire behaviour understanding and to enhance fire management decision-making. This issue (Volume 28, issue...
Author(s): Daniel Moya, Giacomo Certini, Peter Z. Fule
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Event-based integrated assessment of environmental variables and wildfire severity through Sentinel-2 data
www.nrfirescience.org/resource/20478
To optimize suppression, restoration, and prevention plans against wildfire, postfire assessment is a key input. Since little research has been carried out on applying Sentinel-2 imagery through an integrated approach to evaluate how environmental parameters affect fire severity, this work aims to fill this gap. A set of large...
Author(s): Juan Picos, Laura Alonso, Guillermo Bastos, Julia Armesto
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

The consequences of soil heating for prescribed fire use and fire restoration in the South - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/19729
Soil heating resulting from prescribed burning in the southern US has potential immediate and long-term impacts. Where fire is being restored to long-unburned sites, the duration and depth of soil heating may be substantial, affecting seed banks, soil carbon cycling, and root and rhizosphere systems with often severe repercussions...
Author(s): Leda N. Kobziar, J. Morgan Varner, Jesse K. Kreye, Michael G. Andreu, David R. Godwin
Year Published: 2019
Type: Document
Technical Report or White Paper

**A system dynamics model examining alternative wildfire response policies**

www.nrfirescience.org/resource/20284

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

Author(s): Matthew P. Thompson, Yu Wei, Christopher J. Dunn, Christopher D. O'Connor

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

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**Relationship between soil burn severity in forest fires measured in situ and through spectral indices of remote detection**

www.nrfirescience.org/resource/19657

Forest fires in Galicia have become a serious environmental problem over the years. This is especially the case in the Pontevedra region, where in October 2017 large fires (>500 hectares) burned more than 15,000 Ha. In addition to the area burned being of relevance, it is also very important to know quickly and accurately the...

Author(s): Jose Antonio Sobrino, Rafael Llorens, Cristina Fernández, José M. Fernández-Alonso, José A. Vega

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

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**Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration**

www.nrfirescience.org/resource/18982

Climate change is increasing fire activity in the western United States, which has the potential to accelerate climate-induced shifts in vegetation communities. Wildfire can catalyze vegetation change by killing adult trees that could otherwise persist in climate conditions no longer suitable for seedling establishment and survival...

Author(s): Kimberley T. Davis, Solomon Z. Dobrowski, Philip E. Higuera, Zachary A. Holden, Thomas T. Veblen, Monica T. Rother, Sean A. Parks, Anna Sala, Marco Maneta

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

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**Post-fire wood mulch for reducing erosion potential increases tree seedlings with few impacts on understory plants and soil nitrogen**

www.nrfirescience.org/resource/20215

Following high-severity wildfire, application of mulch on the soil surface is commonly used to stabilize slopes and limit soil erosion potential, protecting ecosystem values at risk. Despite the widespread use of mulch, relatively little is known about its effects on ecosystem recovery and soil processes important for plant re-...

Author(s): Jayne L. Jonas, Erin Berryman, Brett Wolk, Penelope Morgan, Peter R. Robichaud

Year Published: 2019

Type: Document

Book or Chapter or Journal Article
Post-fire recruitment of Great Basin big sagebrush species: spatial and temporal controls along regional gradients of soil temperature and moisture - JFSP Final Report

www.nrfirescience.org/resource/19622

In sagebrush-dominated shrublands of western North America, warmer temperatures coupled with annual grass invasions are increasing the frequency and extent of wildfires. Postfire sagebrush recovery rates are unpredictable and many recent fires have resulted in the apparent loss of sagebrush habitat, resulting in a pressing need to...

Author(s): Alexandra K. Urza, Peter J. Weisberg, Jeanne C. Chambers, Stanley G. Kitchen, Bruce A. Roundy
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Is fire “for the birds”? How two rare species influence fire management across the US

www.nrfirescience.org/resource/20165

The US Endangered Species Act has enabled species conservation but has differentially impacted fire management and rare bird conservation in the southern and western US. In the South, prescribed fire and restoration-based forest thinning are commonly used to conserve the endangered red-cockaded woodpecker (Picoides borealis; RCW... Author(s): Scott L. Stephens, Leda N. Kobziar, Brandon M. Collins, Raymond J. Davis, Peter Z. Fule, William L. Gaines, Joseph L. Ganey, James M. Guldin, Paul F. Hessburg, J. Kevin Hiers, Serra Hoagland, John J. Keane, Ronald E. Masters, Ann E. McKellar, Warren G. Montague, Malcolm P. North, Thomas A. Spies
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Guidelines for aspen restoration in Utah with applicability to the Intermountain West

www.nrfirescience.org/resource/19550

As highly productive and biologically diverse communities, healthy quaking aspen (Populus tremuloides; hereafter aspen) forests provide a wide range of ecosystem services across western North America. Western aspen decline during the last century has been attributed to several causes and their interactions, including altered fire...

Author(s): Stanley G. Kitchen, Patrick N. Behrens, Sherel Goodrich, Ashley Green, John Guyon, Mary H. O'Brien, David Tart
Year Published: 2019
Type: Document
Technical Report or White Paper

Lick Creek Demonstration-Research Forest: 25-Year Fire and Cutting Effects on Vegetation & Fuels - JFSP Final Report

www.nrfirescience.org/resource/20112

Fuels reduction treatments are common in ponderosa pine ecosystems of the interior western United States, but the long-term effects on many key ecosystem attributes remain poorly understood, including: tree growth and mortality; forest fuel loads; understory vegetation diversity and composition; production and distribution of...

Author(s): Christopher R. Keyes, Sharon M. Hood, Anna Sala, Duncan C. Lutes
Year Published: 2019
Type: Document
Technical Report or White Paper
What drives ponderosa pine regeneration following wildfire in the western United States?
www.nrfirescience.org/resource/20620

Ponderosa pine (Pinus ponderosa Lawson & C. Lawson) is a prominent tree species in forests of the western United States. Wildfire activity in ponderosa pine dominated or co-dominated forests has increased dramatically in recent decades, with these recent wildfires often burning in an uncharacteristic manner due to past land...

Author(s): Julie E. Korb, Paula J. Fornwalt, Camille Stevens-Rumann
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Past tree influence and prescribed fire exert strong controls on reassembly of mountain grasslands after tree removal
www.nrfirescience.org/resource/19484

Woody plant encroachment represents a global threat to grasslands. Although the causes and consequences of this regime shift have received substantial attention, the processes that constrain reassembly of the grassland state remain poorly understood. We experimentally tested two potentially important controls on reassembly, the...

Author(s): Charles B. Halpern, Joseph A. Antos, Shan Kothari, Annette M. Olson
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

High fire disturbance in forests leads to longer recovery, but varies by forest type
www.nrfirescience.org/resource/20584

Across the world, millions of hectares of forest are burned by wildfires each year. Satellite remote sensing, particularly when used in time series, can describe complex disturbance?recovery processes, but is underutilized by ecologists. This study examines whether a greater disturbance magnitude equates to a longer recovery...

Author(s): Samuel Hislop, Simon D. Jones, Mariela Soto-Berelov, Andrew K. Skidmore, Andrew Haywood, Trung H. Nguyen
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Peatland vegetation change and establishment of re-introduced Sphagnum moss after prescribed burning
www.nrfirescience.org/resource/19377

Fire, including prescribed burning, is common on peatlands globally and can affect vegetation, including peat-forming Sphagnum mosses, and affect ecosystem services. We monitored vegetation in different burn-age categories at three UK peatland sites over a 19-month period. Half of the plots had Sphagnum fragments added and their...

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

Tamm Review: Seedling-based ecology, management, and restoration in aspen (Populus tremuloides)
www.nrfirescience.org/resource/18788
Quaking or trembling aspen (Populus tremuloides Michx.) is a foundational tree species, which is native, common, and broadly distributed in North America. The ecology of aspen has been extensively studied throughout its range, but both research and forest management practices have focused primarily on its ability to regenerate...

Author(s): Simon M. Landhäusser, Bradley D. Pinno, Karen Mock
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Survival of Whitebark Pine Seedlings Grown from Direct Seeding: Implications for Regeneration and Restoration under Climate Change
www.nrfirescience.org/resource/20004
Whitebark pine populations are declining nearly range-wide, primarily from the exotic fungal pathogen that causes white pine blister rust (WPBR). Climate change is expected to exacerbate these declines by decreasing climatically suitable areas. Planting WPBR-resistant seedlings is a key restoration action, but it is costly, time...

Author(s): Elizabeth R. Pansing, Diana F. Tomback
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Potential for post-fire recovery of Greater Sage-grouse habitat
www.nrffirescience.org/resource/20487
In the western United States, fire has become a significant concern in the management of big sagebrush (Artemisia tridentata Nutt.) ecosystems. This is due to large?scale increases in cover of the fire?prone invasive annual cheatgrass (Bromus tectorum L.) and, concurrently, concerns about declining quantity and quality of...

Author(s): Corinna Riginos, Thomas A. Monaco, Kari E. Veblen, Kevin L. Gunnell, Eric Thacker, David K. Dahlgren, Terry A. Messmer
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Understanding ecological contexts for active reforestation following wildfires
www.nrfirescience.org/resource/19314
To forestall loss of ecological values associated with forests, land managers need to consider where and when to prioritize active reforestation following major disturbance events. To aid this decision-making process, we summarize recent research findings pertaining to the Sierra Nevada region of California, USA to identify contexts...

Author(s): Angela M. White, Jonathan Long
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Landscape and organismal factors affecting sagebrush-seedling transplant survival after megafire restoration
www.nrfirescience.org/resource/19921
Larger and more frequent disturbances are motivating efforts to accelerate recovery of foundational perennial species by focusing efforts into establishing island patches to sustain keystone species and facilitate recovery of the surrounding plant community. Evaluating the variability in abiotic and biotic factors that contribute to...
Post-fire soil erosion mitigation at the scale of swales using forest logging residues at a reduced application rate
www.nrfirescience.org/resource/20482
Mulching with forest residues has proved to be highly effective in reducing post-fire soil losses at the plot scale. However, its effectiveness has not been quantified at the application rates that are typically used in operational post-fire land management (2-3 Mg ha⁻¹ using straw), as well as at scales larger than 100 m².

Operationalizing resilience and resistance concepts to address invasive grass-fire cycles
www.nrfirescience.org/resource/19846
Plant invasions can affect fuel characteristics, fire behavior, and fire regimes resulting in invasive plant-fire cycles and alternative, self-perpetuating states that can be difficult, if not impossible, to reverse. Concepts related to general resilience to disturbance and resistance to invasive plants provide the basis for...

Post-fire management impact on natural forest regeneration through altered microsite conditions
www.nrfirescience.org/resource/20419
High severity stand-replacing wildfires can deeply affect forest ecosystems whose composition includes plant species lacking fire-related traits and specific adaptations. Land managers and policymakers need to be aware of the importance of properly managing these ecosystems, adopting post-disturbance interventions designed to reach...

Could restoration of a landscape to a pre-European historical vegetation condition reduce burn probability?
www.nrfirescience.org/resource/19046
Montane regions throughout western North America have experienced increases in forest canopy closure and forest encroachment into grasslands over the past century; this has been attributed to climate change and fire suppression/exclusion. These changes threaten ecological values and potentially increase probabilities of intense...
Long-Term Vegetation Recovery and Invasive Annual Suppression in Native and Introduced Postfire Seeding Treatments
www.nrfirescience.org/resource/20244
Seed mixes used for postfire seeding in the Great Basin are often selected on the basis of short-term rehabilitation objectives, such as ability to rapidly establish and suppress invasive exotic annuals (e.g., cheatgrass, Bromus tectorum L.). Longer-term considerations are also important, including whether seeded plants persist...
Author(s): Jeffrey E. Ott, Francis F. Kilkenny, Daniel D. Summers, Tyler W. Thompson
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

An assessment of fire refugia importance criteria ranked by land managers
www.nrfirescience.org/resource/19643
There is evidence that forest resiliency is declining in the western US due to recent increases in both areas burned by wildfire and the number of large fires. Fire refugia may increase forest resiliency; however, for land managers to incorporate fire refugia into their management plans, methods need to be developed to identify and...
Author(s): Anthony Martinez, Arjan J. H. Meddens, Crystal A. Kolden, Andrew T. Hudak
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Can’t see the random forest for the decision trees: selecting predictive models for restoration ecology
www.nrfirescience.org/resource/18952
Improving predictions of restoration outcomes is increasingly important to resource managers for accountability and adaptive management, yet there is limited guidance for selecting a predictive model from the multitude available. The goal of this paper was to identify an optimal predictive framework for restoration ecology using...
Author(s): David M Barnard, Matthew J. Germino, David S. Pilliod, Robert S. Arkle, Cara Applestein, Bill E. Davidson, Matthew R. Fisk
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Transient population dynamics impede restoration and may promote ecosystem transformation after disturbance
www.nrfirescience.org/resource/20172
The apparent failure of ecosystems to recover from increasingly widespread disturbance is a global concern. Despite growing focus on factors inhibiting resilience and restoration, we still know very little about how demographic and population processes influence recovery. Using inverse and forward demographic modelling of 531 post...
Author(s): Robert K. Shriver, Caitlin M. Andrews, Robert S. Arkle, David M Barnard, Michael C. Duniway, Matthew J. Germino, David S. Pilliod, David A. Pyke, Justin L. Welty, John Bradford
Year Published: 2019
Type: Document
Book or Chapter or Journal Article
Extensive high-severity wildfires have driven major losses of ponderosa pine and mixed-conifer forests in the southwestern United States, in some settings catalyzing enduring conversions to non-forested vegetation types. Management interventions to reduce the probability of stand-replacing wildfire have included mechanical...

Author(s): Ryan B. Walker, Jonathan D. Coop, Sean A. Parks, Laura Trader
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Fire resistance and regeneration characteristics of Northern Rockies tree species

Wildfire is a common occurrence in the Northern Rockies and many tree species have adaptations to survive and regenerate after fire. The following information provides a general understanding of fire resistance and regeneration traits and strategies. This information is important for predicting how fire will impact trees in an area...

Author(s): Sharon M. Hood, Ilana L. Abrahamson, C. Alina Cansler
Year Published: 2018
Type: Document
Synthesis

Do post-fire fuel treatments and annual grasses interact to affect fire regimes in the Great Basin? - Final Report to the Joint Fire Science Program

Shifting climates and annual grass invasions have contributed to the increased number and size of fires in the western United States costing millions of dollars in fire suppression and post-fire rehabilitation. Post-fire rehabilitation implements fuel treatments, such as aerial and drill seeding, to control annual grass invasion and...

Author(s): Beth A. Newingham, Eva K. Strand
Year Published: 2018
Type: Document
Technical Report or White Paper

A conservation paradox in the Great Basin—Altering sagebrush landscapes with fuel breaks to reduce habitat loss from wildfire

Interactions between fire and nonnative, annual plant species (that is, “the grass/fire cycle”) represent one of the greatest threats to sagebrush (Artemisia spp.) ecosystems and associated wildlife, including the greater sage-grouse (Centrocercus urophasianus). In 2015, U.S. Department of the Interior called for a “science-...

Author(s): Douglas J. Shinneman, Cameron L. Aldridge, Peter S. Coates, Matthew J. Germino, David S. Pilliod, Nicole M. Vaillant
Year Published: 2018
Type: Document
Technical Report or White Paper

Thresholds and hotspots for shrub restoration following a heterogeneous megafire

Context: Reestablishing foundational plant species through aerial seeding is an essential yet challenging step for restoring the vast semiarid landscapes impacted by plant invasions and wildfire-regime shifts. A key component of the challenge stems from landscape variability and its effects on
Designer Niches Promote Seedling Survival in Forest Restoration: A 7-Year Study of Whitebark Pine (Pinus albicaulis) Seedlings in Waterton Lakes National Park

Designer niches in which environmental variables are controlled are useful in forest restoration to enhance survival of planted tree seedlings. Here, we evaluate particular manipulated habitats, on site variables, and pre-seedling conditions hypothesized to improve the survival rate of whitebark pine (Pinus albicaulis) seedlings out...

Influence of landscape structure, topography, and forest type on spatial variation in historical fire regimes, Central Oregon, USA

Context: In the interior Northwest, debate over restoring mixed-conifer forests after a century of fire exclusion is hampered by poor understanding of the pattern and causes of spatial variation in historical fire regimes. Objectives: To identify the roles of topography, landscape structure, and forest type in driving spatial...

Vegetation succession in post-fire seeding treatments - Final Report to the Joint Fire Science Program

Seed mixes used for post-fire seeding in the Great Basin are often selected based on short-term rehabilitation objectives, such as ability to rapidly establish and suppress invasive exotic annuals that drive altered fire-regimes via fine build-up (e.g. cheatgrass, Bromus tectorum L.), but longer-term considerations are also...

High and dry: post?fire tree seedling establishment in subalpine forests decreases with post?fire drought and large stand?replacing burn patches

Aim Climate warming and increased wildfire activity are hypothesized to catalyse biogeographical shifts, reducing the resilience of fire?prone forests world?wide. Two key mechanisms underpinning hypotheses are: (1) reduced seed availability in large stand?replacing burn patches, and (2) reduced seedling establishment/survival...

Author(s): Matthew J. Germino, David M Barnard, Robert S. Arkle, David S. Pilliod, Matthew R. Fisk, Cara Applestein
Year Published: 2018
Type: Document
Book or Chapter or Journal Article
Whitebark pine (Pinus albicaulis Engelm.) forests in western North America are increasingly threatened by the exotic pathogen white pine blister rust (Cronartium ribicola J.C. Fisch.). Whitebark pine is designated a high priority species on the candidate list of Endangered or Threatened species, spurring activity to monitor the rust...

Author(s): Carl E. Fiedler, Shawn T. McKinney

When relationships estimated in the past cannot be used to predict the future: using mechanistic models to predict landscape ecological dynamics in a changing world

Researchers and natural resource managers need predictions of how multiple global changes (e.g., climate change, rising levels of air pollutants, exotic invasions) will affect landscape composition and ecosystem function. Ecological predictive models used for this purpose are constructed using either a mechanistic (process-based) or...

Author(s): Eric J. Gustafson

A regional experiment to evaluate effects of fire and fire surrogate treatments in the sagebrush biome - Final Report to the Joint Fire Science Program

SageSTEP is a comprehensive regional experiment that provides critical information to managers faced with a sagebrush steppe ecosystem that is increasingly at risk from wildfire, invasive plants, and climate change. The experiment provides managers with information that can be used to restore ecological communities across the 100+...


Restoring whitebark pine ecosystems in the Northern Rocky Mountains, USA

Whitebark pine (Pinus albicaulis) has been declining across much of its range in North America because of the combined effects of mountain pine beetle (Dendroctonus ponderosae) epidemics, fire exclusion policies, and widespread exotic blister rust infections. Whitebark pine seed is dispersed by a bird, the Clark's nutcracker (...)

Author(s): Robert E. Keane, Russell A. Parsons
Effects of disturbance and management of forest health on fish and fish habitat in eastern Oregon and Washington
www.nrfirescience.org/resource/18562
Effects of fire, forest insects and diseases, grazing, and forest health treatments on fish populations and habitat are reviewed. Fire, insects, and disease affect fish habitat by their influence on the rate and volume of woody debris recruitment to streams, canopy cover and water temperature, stream flow, channel erosion,...
Author(s): Phil Howell
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Linking wilderness research and management, volume 1. Wilderness fire restoration and management: an annotated reading list
www.nrfirescience.org/resource/19692
This reference list provides an overview of key literature relating to fire restoration and management in wilderness and similarly protected areas. This list, which centers on the United States, should be helpful to managers or researchers new to the topic, or to those seeking knowledge about specific aspects of wilderness fire...
Author(s): Marion Hourdequin
Year Published: 2001
Type: Document
Synthesis

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

Whitebark pine ecosystem restoration in western Montana
www.nrfirescience.org/resource/11251
From the Background...'A rapid decline in whitebark pine has occurred during the last 60 years as a result of three interrelated factors: epidemics of mountain pine beetle (Dendroctonus ponderosae); the introduced disease white pine blister rust (Cronartium ribicola); and successional replacement by shade-tolerant conifers,...
Author(s): Robert E. Keane, Stephen F. Arno
Year Published: 1996
Type: Document
Book or Chapter or Journal Article

Restoration of upper subalpine whitebark pine ecosystems in western Montana
www.nrfirescience.org/resource/19233
Description not available
Author(s): Robert E. Keane, Stephen F. Arno, Catherine A. Stewart
Recovery of lotic communities and ecosystems from disturbance - a narrative review of case studies

www.nrfirescience.org/resource/18696

We present a narrative account of case studies of the recovery of flowing water systems from disturbance, focusing on the investigators' conclusions about recovery time and the factors contributing to recovery. We restrict our attention to case studies in which the recovery of some biological property of the system has been examined.

Author(s): J. David Yount, Gerald J. Niemi
Year Published: 1990
Type: Document
Book or Chapter or Journal Article

Whitebark pine cone crops - a diminishing source of wildlife food

www.nrfirescience.org/resource/19234

Whitebark pine (Pinus albicaulis) is found at timberline and in subalpine forests from central California and western Wyoming north to British Columbia and Alberta. This species has been of little interest for commercial timber, but in recent years its large seeds (average 2,600/1 bh) have been recognized as an important food source.

Author(s): Stephen F. Arno
Year Published: 1986
Type: Document
Book or Chapter or Journal Article

Evidence for population differentiation among Jeffrey and Ponderosa pines in survival, growth and phenology

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Ecological restoration projects that include reforestation require that land managers select appropriate source of seeds for long-term persistence. In California, the standard approach for making this choice is based on seed zone and elevational band, both geographically-based measures. However, given the pace of contemporary change...

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