

Seeding locally-sourced native compared to introduced bunchgrasses post-wildfire in frigid Wyoming big sagebrush communities

www.nrfirescience.org/resource/23399

Perennial grasses are often seeded after disturbances to provide ecosystem services and prevent invasive plant dominance. However, there is widespread disagreement over the use of native compared to introduced grasses. In Wyoming big sagebrush (*Artemisia tridentata* Nutt. ssp. *wyomingensis* Beetle & A. Young) communities,...

Author(s): Kirk W. Davies, Chad S. Boyd

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Post-fire management impacts on soil hydrology

www.nrfirescience.org/resource/23270

Research about soil hydrology after wildfire has widely investigated the impacts of many post-fire management strategies on ecosystems with different characteristics. However, despite this ample literature, clear guidelines about the effectiveness and feasibility of the different restoration techniques in environmental contexts...

Author(s): Demetrio Antonio Zema

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Effectiveness of post-fire soil erosion mitigation treatments: A systematic review and meta-analysis

www.nrfirescience.org/resource/23181

Wildfires are known to be one of the main causes of soil erosion and land degradation, and their impacts on ecosystems and society are expected to increase in the future due to changes in climate and land use. It is therefore vital to mitigate the increased hydrological and erosive response after wildfires to maintain the...

Author(s): Antonio Girona-García, Diana C.S. Vieira, Joana Silva, Cristina Fernández, Peter R. Robichaud, Jan J. Keizer

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Undesirable outcomes in seasonally dry forests

www.nrfirescience.org/resource/22872

We appreciate Hutto's call to promote positive ecological outcomes by recognizing diverse forest fire ecologies. Nevertheless, we continue to argue that restoration treatments are appropriate in the approximately 17 million ha of forest in the western US that historically burned every 40 years or less (Rollins 2009). Given ongoing...

Author(s): Scott L. Stephens, Anthony L. Westerling, Matthew D. Hurteau, M. Zachariah Perry, Courtney Schultz, Sally Thompson

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Hillslope sediment fence catch efficiencies and particle sorting for post-fire rain storms

www.nrfirescience.org/resource/22625

Hillslope erosion has often been monitored with sediment fences, but these can underestimate

sediment yields due to overtopping of runoff and associated sediment. We modified four sediment fences to collect and measure the runoff and sediment that overtopped the fence in addition to the sediment deposited behind the fence. Specific...

Author(s): Codie Wilson, Stephanie Kampf, Joseph W. Wagenbrenner, Lee H. MacDonald, Hunter Gleason

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Combining Methods to Estimate Post-Fire Soil Erosion Using Remote Sensing Data

www.nrfirescience.org/resource/23523

The increasing number of wildfires in southern Europe is making our ecosystem more vulnerable to water erosion; i.e., the loss of vegetation and subsequent runoff increase cause a shift in large quantities of sediment. Fire severity has been recognized as one of the most important parameters controlling the magnitude of post-fire...

Author(s): Ilenia Argentiero, Giovanni Francesco Ricci, Mario Elia, Marina D'Este, Vincenzo Giannico, Francisco Vito Ronco, Francesco Gentile, Giovanni Sanesi

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Improving post-wildfire peak streamflow predictions for small watersheds and communities

www.nrfirescience.org/resource/23362

Fire frequency and severity in southern California and across the western United States is increasing, posing a concern to the safety and well-being of communities and ecosystems. Increased aridity coupled with water stressed vegetation from prolonged droughts are leading to a higher propensity for larger, more intense fires that...

Author(s): Alicia M. Kinoshita, Brenton A. Wilder

Year Published: 2021

Type: Document

Technical Report or White Paper

Using ¹³⁷Cs measurements to estimate soil erosion rates in forest stands affected by wildfires. Results from plot experiments

www.nrfirescience.org/resource/23254

The destruction of forest cover by wildfires has important consequences on the stability of forest ecosystems. It is well recognized that forests play a key role in regulating the hydrological cycle by modifying rainfall interception and evapotranspiration but also affecting hydrological and erosion responses of the soil surface....

Author(s): Paolo Porto, Giovanni Callegari

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Effectiveness of post-fire salvage logging stream buffer management

www.nrfirescience.org/resource/23107

Active wildfire seasons in the western U.S. warrant the evaluation of post-fire forest management strategies. Ground-based salvage logging is often used to recover economic loss of burned timber. In unburned forests, ground-based logging often follows best management practices by leaving undisturbed areas near streams called...

Author(s): Peter R. Robichaud, Edwin D. Bone, Sarah A. Lewis, Erin S. Brooks, Robert E. Brown

Year Published: 2021
Type: Document
Book or Chapter or Journal Article

Factors affecting connectivity and sediment yields following wildfire and post-fire salvage logging in California's Sierra Nevada

www.nrfirescience.org/resource/23061

Sediment delivery following post-fire logging is a concern relative to water quality. While studies have assessed the effect of post-fire logging on sediment yields at different spatial scales, none have explicitly identified sediment sources. Our goal was to quantify post-fire and post-salvage logging sediment yields and use rill...

Author(s): Will H. Olsen, Joseph W. Wagenbrenner, Peter R. Robichaud

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

The propagule doesn't fall far from the tree, especially after short-interval, high-severity fire

www.nrfirescience.org/resource/23051

Subalpine forests that historically burned every 100–300 yr are expected to burn more frequently as climate warms, perhaps before trees reach reproductive maturity or produce a serotinous seedbank. Tree regeneration after short-interval (<30-yr) high-severity fire will increasingly rely on seed dispersal from unburned...

Author(s): Nathan S. Gill, Tyler J. Hoecker, Monica G. Turner

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Tracking rates of postfire conifer regeneration vs. deciduous vegetation recovery across the western United States

www.nrfirescience.org/resource/22869

Postfire shifts in vegetation composition will have broad ecological impacts. However, information characterizing postfire recovery patterns and their drivers are lacking over large spatial extents. In this analysis, we used Landsat imagery collected when snow cover (SCS) was present, in combination with growing season (GS) imagery...

Author(s): Melanie K. Vanderhoof, Todd J. Hawbaker, Andrea Ku, Kyle E. Merriam, Erin Berryman, Megan E. Cattau

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Effectiveness of post-fire salvage logging stream buffer management for hillslope erosion in the U.S. Inland Northwest Mountains

www.nrfirescience.org/resource/22610

Active wildfire seasons in the western U.S. warrant the evaluation of post-fire forest management strategies. Ground-based salvage logging is often used to recover economic loss of burned timber. In unburned forests, ground-based logging often follows best management practices by leaving undisturbed areas near streams called...

Author(s): Peter R. Robichaud, Edwin D. Bone, Sarah A. Lewis, Erin S. Brooks, Robert E. Brown

Year Published: 2021

Type: Document

Book or Chapter or Journal Article

Long-Term Post-Fire Vegetation Recovery

www.nrfirescience.org/resource/20896

Many large fires have burned in recent decades across western North America, and this trend is projected to continue as conditions become warmer and drier. Recovery processes have been studied more thoroughly 1-2 years post fire than in the longer term. Fuel and fire managers need better information on long-term post-fire ecosystem...

Author(s): Andrew T. Hudak, Leda N. Kobziar, Karen L. Riley

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Post-fire growth of seeded and planted big sagebrush - strategic designs for restoring Greater Sage-grouse nesting habitat

www.nrfirescience.org/resource/22320

Wildfires change plant community structure and impact wildlife habitat and population dynamics. Recent wildfire-induced losses of big sagebrush (*Artemisia tridentata*) in North American shrublands are outpacing natural recovery and leading to substantial losses in habitat for sagebrush-obligate species such as Greater Sage...

Author(s): David A. Pyke, Robert K. Shriver, Robert S. Arkle, David S. Pilliod, Cameron L. Aldridge, Peter S. Coates, Matthew J. Germino, Julie A. Heinrichs, Mark A. Ricca, Scott E. Shaff

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Effects of two emergency stabilization treatments on main soil properties four years after application in a severely burnt area

www.nrfirescience.org/resource/20814

In NW of the Iberian Peninsula, the incidence of anthropogenic fires is very high and, due to the climatologic and topographical conditions, burnt soils are prone to high erosion risks. In recent years several environmental management techniques (BAER: burnt area emergency response) have been applied after some wildfires, but there...

Author(s): María Fernandez-Fernandez, Serafín J. González-Prieto

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Evaluating post-wildfire logging slash cover treatment to reduce hillslope erosion after salvage logging using ground measurements and remote sensing

www.nrfirescience.org/resource/21931

Continuing long and extensive wildfire seasons in the Western US emphasize the need for better understanding of wildfire impacts including post-fire management scenarios. Advancements in our understanding of post-fire hillslope erosion and watershed response such as flooding, sediment yield, and debris flows have recently...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Robert E. Brown, Edwin D. Bone, Erin S. Brooks

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Temporal evolution of measured and simulated infiltration following wildfire in the Colorado

Front Range, USA: shifting thresholds of runoff generation and hydrologic hazards

www.nrfirescience.org/resource/21484

Destructive flash floods and debris flows are a common menace following wildfire. The restoration of protection provided by forests from post-fire floods and debris flows depends on the recovery of infiltration and attendant reduction of infiltration-excess surface runoff generation. This work examines seven years of post-fire...

Author(s): Brian A. Ebel

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Landscape position amplifies consequences of novel short-interval stand-replacing fires on postfire tree establishment in subalpine conifer forests

www.nrfirescience.org/resource/23052

Stand-replacing fires burned at 100 to 300-year intervals for millennia in subalpine conifer forests of western North America, but forests are burning more frequently as climate warms. Postfire tree regeneration is reduced when young forests reburn before recovering from previous fires or when drought occurs during postfire years....

Author(s): Tyler J. Hoecker, Winslow D. Hansen, Monica G. Turner

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Debris-flow dominated sediment transport through a channel network after wildfire

www.nrfirescience.org/resource/21153

Field studies that investigate sediment transport between debris-flow producing headwaters and rivers are uncommon, particularly in forested settings, where debris flows are infrequent and opportunities for collecting data are limited. This study quantifies volume and composition of sediment deposited in the arterial channel...

Author(s): Petter Nyman, Walter A.C. Box, Justin C. Stout, Gary J. Sheridan, Saskia D. Keesstra, Patrick N. J. Lane, Christoph Langhans

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Connectivity of post-fire runoff and sediment from nested hillslopes and watersheds

www.nrfirescience.org/resource/22499

Wildfire increases the potential connectivity of runoff and sediment throughout watersheds due to greater bare soil, runoff and erosion as compared to pre-fire conditions. This research examines the connectivity of post-fire runoff and sediment from hillslopes (<1.5 ha; n=31) and catchments (<1000 ha; n=10) within two...

Author(s): Codie Wilson, Stephanie Kampf, Sandra E. Ryan-Burkett, Tim Covino, Lee H. MacDonald, Hunter Gleason

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Quantifying long-term post-fire sediment delivery and erosion mitigation effectiveness

www.nrfirescience.org/resource/20975

Large wildfires can have profound and lasting impacts not only from direct consumption of vegetation but also longer-term effects such as persistent soil erosion. The 2002 Hayman Fire burned in one of

the watersheds supplying water to the Denver metropolitan area, thus there was concern regarding hillslope erosion and...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Joseph W. Wagenbrenner, Robert E. Brown, Frederick B. Pierson

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Evaluating post-wildfire logging-slash cover treatment to reduce hillslope erosion after salvage logging using ground measurements and remote sensing

www.nrfirescience.org/resource/22322

Continuing long and extensive wildfire seasons in the Western US emphasize the need for better understanding of wildfire impacts including post-fire management scenarios. Advancements in our understanding of post-fire hillslope erosion and watershed response such as flooding, sediment yield, and debris flows have recently received...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Robert E. Brown, Edwin D. Bone, Erin S. Brooks

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Resources for Postfire Response: Empowering Land Managers with New After Fire Toolkit

www.nrfirescience.org/resource/22202

To improve access and understanding of postfire resources, scientists with the Rocky Mountain Research Station and its partners have drawn on years of science/management collaboration to compile an online resource called the After Fire Toolkit and Information site. The After Fire Toolkit, which can be found at [www.fs.usda.gov/rmrs/...](http://www.fs.usda.gov/rmrs/)

Author(s): Brian Cooke

Year Published: 2020

Type: Document

Research Brief or Fact Sheet

PEMIP: Post-fire erosion model inter-comparison project

www.nrfirescience.org/resource/21784

Land managers often need to predict watershed-scale erosion rates after disturbance or other land cover changes. This study compared commonly used hillslope erosion models to simulate post-fire sediment yields (SY) at both hillslope and watershed scales within the High Park Fire, Colorado, U.S.A. At hillslope scale, simulated SY...

Author(s): Stephanie Kampf, Benjamin Gannon, Codie Wilson, Freddy A. Saavedra, Mary Ellen Miller, Aaron Heldmyer, Ben Livneh, Peter A. Nelson, Lee H. MacDonald

Year Published: 2020

Type: Document

Book or Chapter or Journal Article

Remote sensing of vegetation conditions after post-fire mulch treatments

www.nrfirescience.org/resource/21164

Wildfires are becoming more prevalent and are impacting forests, watersheds and important resources. Hydrologic and geomorphic processes following wildfires can include erosion flooding, and degraded water quality. To mitigate these secondary impacts, post-fire restoration treatments can be applied to a burned area to stabilize the...

Author(s): Viet D. Vo, Alicia M. Kinoshita

Year Published: 2020

Type: Document
Book or Chapter or Journal Article

Post-fire native species seed mixes are effective at keeping out cheatgrass in the Great Basin

www.nrfirescience.org/resource/21016

Seeding an area after a fire has long been used to control erosion and suppress problem invasive grasses like cheatgrass. But for managers, choosing the right seed mix to use can be tricky. Seed mixes containing only native species are ideal for areas where natural vegetation recovery is a long-term objective, but there is a...

Year Published: 2020

Type: Document
Research Brief or Fact Sheet

Effectiveness of straw bale check dams at reducing post-fire sediment yields from steep ephemeral channels

www.nrfirescience.org/resource/20036

Post-fire flooding and elevated sediment loads in channels can pose hazards to people and structures within the wildland-urban interface. Mitigation of these hazards is essential to protect downstream resources. Straw bale check dams are one treatment designed to reduce sediment yields in small ephemeral catchments (<2 ha)....

Author(s): Peter R. Robichaud, Keenan A. Storrar, Joseph W. Wagenbrenner

Year Published: 2019

Type: Document
Book or Chapter or Journal Article

Hydrological impacts of large fires and future climate: modeling approach supported by satellite data

www.nrfirescience.org/resource/22426

Fires have significant impacts on soil erosion and water supply that may be exacerbated by future climate. The aims of this study were: To simulate the effects of a large fire event in the SWAT (Soil and Water Assessment Tool) hydrological model previously calibrated to a medium-sized watershed in Portugal; and to predict the...

Author(s): Claudia Carvalho-Santos, Bruno Marcos, João Pedro Nunes, Adrián Regos, Elisa Palazzi, Silvia Terzago, Antonio T. Monteiro, João P. Honrado

Year Published: 2019

Type: Document
Book or Chapter or Journal Article

Physical vulnerabilities from wildfires: Flames, floods, and debris flows

www.nrfirescience.org/resource/19841

Humans live in or adjacent to wildland ecosystems that burn periodically and are part of nearly all ecosystems that are in the pyrosphere. There are many hazards posed by wildfire and certain consequences of living in these ecosystems. Most are associated with wildfire, but the increased use of prescribed fire is an issue because of...

Author(s): Daniel G. Neary, Jackson M. Leonard

Year Published: 2019

Type: Document
Book or Chapter or Journal Article

Climate will increasingly determine post-fire tree regeneration success in low-elevation forests,

Northern Rockies, USA

www.nrfirescience.org/resource/18803

Climate change is expected to cause widespread shifts in the distribution and abundance of plant species through direct impacts on mortality, regeneration, and survival. At landscape scales, climate impacts will be strongly mediated by disturbances, such as wildfire, which catalyze shifts in species distributions through widespread...

Author(s): Kerry Kemp, Philip E. Higuera, Penelope Morgan, John T. Abatzoglou

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Hydrologic and erosion responses to compaction and added surface cover in post-fire logged areas: Isolating splash, interrill and rill erosion

www.nrfirescience.org/resource/19835

Soil compaction during post-fire logging can increase runoff and erosion. Increasing surface cover is an effective way to reduce erosion, but this has not been tested on soils impacted by both fire and compaction. We measured the effects of compaction (bulk density of 0.9 or 1.1 g cm⁻³) and surface cover (0% or 60%) using bark...

Author(s): Sergio A. Prats, Maruxa C. Malvar, Celeste O.A. Coelho, Joseph W. Wagenbrenner

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Progress in simplifying hydrologic model parameterization for broad applications to post-wildfire flooding and debris-flow hazards

www.nrfirescience.org/resource/20610

Predicting the timing of overland flow in burned watersheds can help to estimate debris-flow timing and the location of debris-flow initiation. Numerical models can produce flow predictions, but they are limited by our knowledge of appropriate model parameters. Moreover, opportunities to test and calibrate model parameters in...

Author(s): Francis K. Rengers, Luke A. McGuire, Jason W. Kean, Dennis M. Staley, Ann M. Youberg

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Long-term vegetation response following post-fire straw mulching

www.nrfirescience.org/resource/19710

Background: Straw mulching is one of the most common treatments applied immediately post fire to reduce soil erosion potential and mitigate post-fire effects on water quality, downstream property, and infrastructure, but little is known about the long-term effects on vegetation response. We sampled six fires that were mulched...

Author(s): Jonathan D. Bontrager, Penelope Morgan, Andrew T. Hudak, Peter R. Robichaud

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Partitioned by process: measuring post-fire debris-flow and rill erosion with structure from motion photogrammetry

www.nrfirescience.org/resource/20574

After wildfire, hillslope and channel erosion produce large amounts of sediment and can contribute significantly to long-term erosion rates. However, pre-erosion high-resolution topographic data (e.g.

lidar) is often not available and determining specific contributions from post-fire hillslope and channel erosion is...

Author(s): Nicholas G. Ellett, Jennifer L. Pierce, Nancy F. Glenn

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

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....

Author(s): Sergio A. Prats, Oscar González-Pelayo, Flávio C. Silva, K. J. Bokhorst, J. E. M. Baartman, Jan J. Keizer

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Fire regime and ecosystem responses: adaptive forest management in a changing world (Part 1)

www.nrfirescience.org/resource/19617

Although fire is an intrinsic factor in most terrestrial biomes, it is often perceived as a negative disturbance that must be suppressed. The application of successful fire prevention policies can lead to unsustainable fire events for ecosystems adapted to a specific fire regime. In addition, new climate and land use scenarios are...

Author(s): Daniel Moya, Giacomo Certini, Peter Z. Fule

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Wildfire as a catalyst for hydrologic and geomorphic change

www.nrfirescience.org/resource/21241

Wildfire has been a constant presence on the Earth since at least the Silurian period, and is a landscape-scale catalyst that results in a step-change perturbation for hydrologic systems, which ripples across burned terrain, shaping the geomorphic legacy of watersheds. Specifically, wildfire alters two key landscape properties: (1)...

Author(s): Francis K. Rengers

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/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

Ponderosa pine regeneration, wildland fuels management, and habitat conservation: identifying trade-offs following wildfire

www.nrfirescience.org/resource/19304

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

Author(s): Victoria M. Donovan, Caleb P. Roberts, Carissa L. Wonkka, David A. Wedin, Dirac Twidwell

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Looking through the window of disturbance at post-wildfire debris-flow hazards

www.nrfirescience.org/resource/21229

The extreme heat from wildfire alters soil properties and incinerates vegetation, leading to changes in infiltration capacity, ground cover, soil erodibility, and rainfall interception. These changes promote increases in runoff and sediment transport that increase the likelihood of runoff-generated debris flows. Over a period of...

Author(s): Luke A. McGuire, Francis K. Rengers, Jason W. Kean, Dennis M. Staley, Hui Tang, Ann M. Youberg

Year Published: 2019

Type: Document

Conference Proceedings

Impacts of successive wildfire on soil hydraulic properties: implications for debris flow hazards and system resilience

www.nrfirescience.org/resource/20177

Climate and land use changes have led to recent increases in fire size, severity, and/or frequency in many different geographic regions and ecozones. Most post-wildfire geomorphology studies focus on the impact of a single wildfire but changing wildfire regimes underscore the need to quantify the effects of repeated disturbance by...

Author(s): Luke A. McGuire, Ann M. Youberg

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Origins of abrupt change? Postfire subalpine conifer regeneration declines nonlinearly with warming and drying

www.nrfirescience.org/resource/19044

Robust tree regeneration following high-severity wildfire is key to the resilience of subalpine and boreal forests, and 21st century climate could initiate abrupt change in forests if postfire temperature and soil moisture become less suitable for tree seedling establishment. Using two widespread conifer species, lodgepole pine (...)

Author(s): Winslow D. Hansen, Monica G. Turner

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-Urdiroz, Donatella Spano, Bachisio Arca

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Geomorphic complexity and sensitivity in channels to fire and floods in mountain catchments

www.nrfirescience.org/resource/19900

Fires and floods are important drivers of geomorphic change. While the hydrologic and geomorphic effects of fires have been studied at the hillslope scale, we have much more limited data on post-fire runoff, channel changes, and inferred or measured sediment storage and delivery at larger scales. In this study we intensively...

Author(s): Dan Brogan, Lee H. MacDonald, Peter A. Nelson, Jacob A. Morgan

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Post-fire vegetation communities in western Colorado

www.nrfirescience.org/resource/20877

Wildfire is a cause of disturbance on public lands, and post-fire treatments often include broadcast seeding of native and non-native seeds. We collected vegetation data from an area burned by a wildfire in western Colorado in 2012 and, where available, compared pre- and post-fire data. We sought to determine how dominant plant...

Author(s): M Nikki Grant-Hoffman, James Dollerschell

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Soil carbon and nitrogen eroded after severe wildfire and erosion mitigation treatments

www.nrfirescience.org/resource/19840

Erosion of soil carbon (C) and nitrogen (N) following severe wildfire may have deleterious effects on downstream resources and ecosystem recovery. Although C and N losses in combustion and runoff have been studied extensively, soil C and N transported by post-fire erosion has rarely been quantified in burned landscapes. To better...

Author(s): Derek N. Pierson, Peter R. Robichaud, Charles C. Rhoades, Robert E. Brown

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Partitioned by process: Measuring post-fire debris-flow and rill erosion with structure from motion photogrammetry

www.nrfirescience.org/resource/20624

After wildfire, hillslope and channel erosion produce large amounts of sediment and can contribute significantly to long-term erosion rates. However, pre-erosion high-resolution topographic data (e.g. lidar) is often not available and determining specific contributions from post-fire hillslope and channel erosion is...

Author(s): Nicholas G. Ellett, Jennifer L. Pierce, Nancy F. Glenn

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Evolution of debris-flow initiation mechanisms and sediment sources during a sequence of post-wildfire rainstorms

www.nrfirescience.org/resource/19820

Wildfire alters vegetation cover and soil hydrologic properties, substantially increasing the likelihood of debris flows in steep watersheds. Our understanding of initiation mechanisms of post-wildfire debris flows is limited, in part, by a lack of direct observations and measurements. In particular, there is a need to understand...

Author(s): Luke A. McGuire, Francis K. Rengers, Jason W. Kean, Dennis M. Staley, Joel B. Smith

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

The effects of post-fire forest management on soil erosion rates 3 and 4 years after a wildfire, demonstrated on the 2010 Mount Carmel fire

www.nrfirescience.org/resource/19621

During 2-5 December 2010, an area of 2500 ha in the Carmel forests was consumed by a severe wildfire, causing soil erosion from the exposed slopes. Whereas most studies show that post-fire

erosion rates tend to decline after the second year, in this case, we aim to address the ongoing consequences that different management...

Author(s): Rami Zituni, Lea Wittenberg, Dan Malkinson

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Insect communities in big sagebrush habitat are altered by wildfire and post-fire restoration seeding

www.nrfirescience.org/resource/21256

Natural resource managers sow grass, forb, and shrub seeds across millions of hectares of public lands in the western United States to restore sagebrush-steppe ecosystems burned by wildfire. The effects of post-fire vegetation treatments on insect communities in these ecosystems have not been investigated. We conducted the first...

Author(s): Ashley T. Rohde, David S. Pilliod, Stephen J. Novak

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

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. Kilkenney, Daniel D. Summers, Tyler W. Thompson

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

Taking the pulse of debris flows: Extracting debris-flow dynamics from good vibrations in southern California and central Colorado

www.nrfirescience.org/resource/21234

The destructive nature of debris flows makes it difficult to quantify flow dynamics with direct instrumentation. For this reason, seismic sensors placed safely away from the flow path are often used to identify the timing and speed of debris flows. While seismic sensors have proven to be a valuable tool for event detection and early...

Author(s): A. Michel, Jason W. Kean, Joel B. Smith, Kate E. Allstadt, Jeffrey A. Coe

Year Published: 2019

Type: Document
Conference Proceedings

Post-wildfire sediment cascades: a modeling framework linking debris flow generation and network-scale sediment routing

www.nrfirescience.org/resource/20180

Wildfires represent one of the largest disturbances in watersheds of the Intermountain West. Yet, we lack models capable of predicting post-wildfire impacts on downstream ecosystems and infrastructure. Here we present a novel modeling framework that links new and existing models to simulate the post-wildfire sediment cascade,...

Author(s): Brendan P. Murphy, Jonathan A. Czuba, Patrick Belmont

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Postwildfire seeding to restore native vegetation and limit exotic annuals: an evaluation in juniper-dominated sagebrush steppe

www.nrfirescience.org/resource/19222

Reestablishment of perennial vegetation is often needed after wildfires to limit exotic species and restore ecosystem services. However, there is growing body of evidence that questions if seeding after wildfires increases perennial vegetation and reduces exotic plants. The concern that seeding may not meet restoration goals is even...

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

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

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

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

www.nrfirescience.org/resource/18258

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

Author(s): Francis F. Kilkenny, Jeffrey E. Ott, Daniel D. Summers, Tyler W. Thompson

Year Published: 2018

Type: Document

Technical Report or White Paper

Rainfall thresholds for post-fire runoff and sediment delivery from plot to watershed scales

www.nrfirescience.org/resource/18063

Wildfire increases the likelihood of runoff, erosion, and downstream sedimentation in many of the watersheds that supply water for Colorado's Front Range communities. The objectives of this study were to: (1) identify rainfall intensity thresholds for a post-fire runoff or sediment delivery response at plots (?0.06 ha),...

Author(s): Codie Wilson, Stephanie Kampf, Joseph W. Wagenbrenner, Lee H. MacDonald

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Post-fire water-quality response in the western United States

www.nrfirescience.org/resource/17502

Wildfires are increasing in size and severity in forested landscapes across the Western United States. Not only do fires alter land surfaces, but they also affect the surface water quality in downstream systems. Previous studies of individual fires have observed an increase in various forms of nutrients, ions, sediments and metals...

Author(s): Ashley J. Rust, Terri S. Hogue, Samuel Saxe, John McCray

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Recovery of small-scale infiltration and erosion after wildfires

www.nrfirescience.org/resource/18831

Wildfires naturally occur worldwide, however the potential disruption to ecosystem services from subsequent post-fire flooding and erosion often necessitates a response from land managers. The impact of high severity wildfire on infiltration and interrill erosion responses was evaluated for five years after the 2003 Hot Creek Fire...

Author(s): Sierra S. Larson-Nash, Peter R. Robichaud, Frederick B. Pierson, Corey A. Moffet, C. Jason Williams, Kenneth E. Spaeth, Robert E. Brown, Sarah A. Lewis

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Estimating post-fire debris-flow hazards prior to wildfire using a statistical analysis of historical distributions of fire severity from remote sensing data

www.nrfirescience.org/resource/18131

Following wildfire, mountainous areas of the western United States are susceptible to debris flow during intense rainfall. Convective storms that can generate debris flows in recently burned areas may occur during or immediately after the wildfire, leaving insufficient time for development and implementation of risk mitigation...

Author(s): Dennis M. Staley, Anne Tillery, Jason W. Kean, Luke A. McGuire, Hannah E. Pauling, Francis K. Rengers, Joel B. Smith

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Post-wildfire seeding to restore native vegetation and limit exotic annuals: an evaluation in juniper-dominated sagebrush steppe

www.nrfirescience.org/resource/17926

Reestablishment of perennial vegetation is often needed after wildfires to limit exotic species and restore ecosystem services. However, there is growing body of evidence that questions if seeding after wildfires increases perennial vegetation and reduces exotic plants. The concern that seeding may not meet restoration goals is even...

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

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Do Post-Fire Mulching Treatments Affect Regeneration in Serotinous Lodgepole Pine?

www.nrfirescience.org/resource/16336

Broadcast mulching is a widely implemented post-fire erosion control method, although it remains uncertain how it affects post-fire regeneration in serotinous conifers. We used field data and unbiased conditional inference trees with random effects to test if mulching affects lodgepole pine (*Pinus contorta* Dougl. ex Loud. var....

Author(s): Micah Wright, Monique E. Rocca

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Avian community responses to post-fire forest structure: implications for fire management in mixed conifer forests

www.nrfirescience.org/resource/22078

Fire is a natural process and the dominant disturbance shaping plant and animal communities in many coniferous forests of the western US. Given that fire size and severity are predicted to increase in the future, it has become increasingly important to understand how wildlife responds to fire and post-fire management. The Angora...

Author(s): Angela M. White, Patricia N. Manley, Gina L. Tarbill, T. Will Richardson, Robin E. Russell, Hugh Safford, Solomon Z. Dobrowski

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Rill erosion in burned and salvage logged western montane forests: effects of logging equipment type, traffic level, and slash treatment

www.nrfirescience.org/resource/23063

Following wildfires, forest managers often consider salvage logging burned trees to recover monetary value of timber, reduce fuel loads, or to meet other objectives.. Relatively little is known about the cumulative hydrologic effects of wildfire and subsequent timber harvest using logging equipment. We used controlled rill...

Author(s): Joseph W. Wagenbrenner, Peter R. Robichaud, Robert E. Brown

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Rapid response tools and datasets for post-fire modeling: linking earth observations and process-based hydrological models to support post-fire remediation

www.nrfirescience.org/resource/15538

Post-wildfire flooding and erosion can threaten lives, property and natural resources. Increased peak flows and sediment delivery due to the loss of surface vegetation cover and fire-induced changes in soil

properties are of great concern to public safety. Burn severity maps derived from remote sensing data reflect fire-induced...

Author(s): Mary Ellen Miller, Michael Billmire, William J. Elliot, Kevin A. Endsley, Peter R. Robichaud
Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Rapid-response tools and datasets for post-fire remediation: linking remote sensing and process-based hydrological models

www.nrfirescience.org/resource/14641

Post-wildfire flooding and erosion can threaten lives, property and natural resources. Increased peak flows and sediment delivery due to the loss of surface vegetation cover and fire-induced changes in soil properties are of great concern to public safety. Burn severity maps derived from remote sensing data reflect fire-induced...

Author(s): Mary Ellen Miller, William J. Elliot, Peter R. Robichaud, Kevin A. Endsley

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

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

www.nrfirescience.org/resource/18412

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): Brian J. Harvey, Daniel C. Donato, Monica G. Turner

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Rapid response tools and datasets for post-fire modeling: linking earth observations and process-based hydrological models to support post-fire remediation

www.nrfirescience.org/resource/13466

Preparation is key to utilizing Earth Observations and process-based models to support post-wildfire mitigation. Post-fire flooding and erosion can pose a serious threat to life, property and municipal water supplies. Increased runoff and sediment delivery due to the loss of surface cover and fire-induced changes in soil...

Author(s): Mary Ellen Miller, Michael Billmire, William J. Elliot, Kevin A. Endsley, Peter R. Robichaud

Year Published: 2015

Type: Document

Conference Proceedings

Vegetation response to burn severity, native grass seeding, and salvage logging

www.nrfirescience.org/resource/13422

As the size and extent of wildfires has increased in recent decades, so has the cost and extent of post-fire management, including seeding and salvage logging. However, we know little about how burn severity, salvage logging, and post-fire seeding interact to influence vegetation recovery long-term. We sampled understory plant...

Author(s): Penelope Morgan, Marshall Moy, Christine A. Droske, Leigh B. Lentile, Sarah A. Lewis, Peter R. Robichaud, Andrew T. Hudak, Christopher Jason Williams

Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Assessing soil and vegetation recovery following the 2005 School Fire, Umatilla National Forest - 10-year update

www.nrfirescience.org/resource/12811

Following the 2005 School Fire which burned ~ 50,000 acres across forest and grasslands, managers were particularly concerned with treating severely burned areas to mitigate weed spread and to limit soil erosion. Various mulching treatments (wheat straw, wood strand, and hydromulch) were implemented to control...

Author(s): Peter R. Robichaud, Penelope Morgan, Leigh B. Lentile, Sarah A. Lewis, Andrew T. Hudak, Deborah S. Page-Dumroese

Year Published: 2015

Type: Document

Research Brief or Fact Sheet

Predicting spatial distribution of postfire debris flows and potential consequences for native trout in headwater streams

www.nrfirescience.org/resource/20530

Habitat fragmentation and degradation and invasion of nonnative species have restricted the distribution of native trout. Many trout populations are limited to headwater streams where negative effects of predicted climate change, including reduced stream flow and increased risk of catastrophic fires, may further jeopardize their...

Author(s): Edwin R. Sedell, Robert E. Gresswell, Thomas E. McMahon

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Vegetation response after post-fire mulching and native grass seeding

www.nrfirescience.org/resource/15317

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

Author(s): Penelope Morgan, Marshall Moy, Christine A. Droske, Leigh B. Lentile, Sarah A. Lewis, Peter R. Robichaud, Andrew T. Hudak

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

A synthesis of post-fire Burned Area Reports from 1972 to 2009 for western US Forest Service lands: trends in wildfire characteristics and post-fire stabilisation treatments and expenditures

www.nrfirescience.org/resource/13010

Over 1200 post-fire assessment and treatment implementation reports from four decades (1970s-2000s) of western US forest fires have been examined to identify decadal patterns in fire characteristics and the justifications and expenditures for the post-fire treatments. The main trends found were: (1) the area burned by wildfire...

Author(s): Peter R. Robichaud, Hakjun Rhee, Sarah A. Lewis

Year Published: 2014

Type: Document

Book or Chapter or Journal Article, Synthesis

New insights into debris-flow hazards from an extraordinary event in the Colorado Front Range

www.nrfirescience.org/resource/18709

Rainfall on 9–13 September 2013 triggered at least 1,138 debris flows in a 3430 km² area of the Colorado Front Range. The historical record reveals that the occurrence of these flows over such a large area in the interior of North America is highly unusual. Rainfall that triggered the debris flows began after ~75 mm of antecedent...

Author(s): Jeffrey A. Coe, Jason W. Kean, Jonathan W. Godt, Rex L. Baum, Eric S. Jones, David Gochis, Gregory S. Anderson

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Climate change impacts in the United States: The third National Climate Assessment

www.nrfirescience.org/resource/18981

Climate change is already affecting the American people in farreaching ways. Certain types of extreme weather events with links to climate change have become more frequent and/or intense, including prolonged periods of heat, heavy downpours, and, in some regions, floods and droughts. In addition, warming is causing sea level to rise...

Year Published: 2014

Type: Document

Technical Report or White Paper

Using native annual plants to restore post-fire habitats in western North America

www.nrfirescience.org/resource/12139

Increasing fire frequencies and uncharacteristic severe fires have created a need for improved restoration methods across rangelands in western North America. Traditional restoration seed mixtures of native perennial mid- to late-seral plant species may not be suitable for intensely burned sites that have been returned to an early-...

Author(s): Christopher M. Herron, Jayne L. Jonas, Paul J. Meiman, Mark W. Paschke

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Effectiveness of post-fire Burned Area Emergency Response (BAER) road treatments: results from three wildfires

www.nrfirescience.org/resource/12142

Wildland fires often cause extreme changes in the landscape that drastically influence surface runoff and soil erosion, which can impact forest resources, aquatic habitats, water supplies, public safety, and forest access infrastructure such as forest roads. Little information is available on the effectiveness of various post-fire...

Author(s): Randy B. Foltz, Peter R. Robichaud

Year Published: 2013

Type: Document

Technical Report or White Paper

Post-fire mulching for runoff and erosion mitigation; Part I: effectiveness at reducing hillslope erosion rates

www.nrfirescience.org/resource/11994

Mulch treatments often are used to mitigate post-fire increases in runoff and erosion rates but the comparative effectiveness of various mulches is not well established. The ability of mulch treatments to reduce sediment yields from natural rainfall and resulting overland flow was measured using hillslope plots on areas burned at...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Joseph W. Wagenbrenner, Louise E. Ashmun, Robert E. Brown

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Does seeding after wildfires in rangelands reduce erosion or invasive species?

www.nrfirescience.org/resource/12132

Mitigation of ecological damage caused by rangeland wildfires has historically been an issue restricted to the western United States. It has focused on conservation of ecosystem function through reducing soil erosion and spread of invasive plants. Effectiveness of mitigation treatments has been debated recently. We reviewed recent...

Author(s): David A. Pyke

Year Published: 2013

Type: Document

Book or Chapter or Journal Article, Synthesis

Assessing the success of postfire reseeding in semiarid rangelands using terra MODIS

www.nrfirescience.org/resource/11489

Successful post-fire reseeding efforts may aid rangeland ecosystem recovery by rapidly establishing a desired plant community and thereby reducing the likelihood of infestation by invasive plants. While the success of post-fire remediation is critical, few efforts have been made to leverage existing geospatial technologies to...

Author(s): Fang Chen, Keith T. Weber, John L. Schnase

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Enhanced sediment delivery in a changing climate in semi-arid mountain basins: implications for water resource management and aquatic habitat in the northern Rocky Mountains

www.nrfirescience.org/resource/18718

The delivery and transport of sediment through mountain rivers affects aquatic habitat and water resource infrastructure. While climate change is widely expected to produce significant changes in hydrology and stream temperature, the effects of climate change on sediment yield have received less attention. In the northern Rocky...

Author(s): Jaime R. Goode, Charles H. Luce, John M. Buffington

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Probability and volume of potential postwildfire debris flows in the 2012 High Park Burn Area near Fort Collins, Colorado

www.nrfirescience.org/resource/18725

This report presents a preliminary emergency assessment of the debris-flow hazards from drainage basins burned by the 2012 High Park fire near Fort Collins in Larimer County, Colorado. Empirical models derived from statistical evaluation of data collected from recently burned basins throughout the intermountain western United States...

Author(s): Kristine L. Verdin, Jean A. Dupree, John G. Elliott
Year Published: 2012
Type: Document
Technical Report or White Paper

Recent trends in post-wildfire seeding in western US forests: costs and seed mixes

www.nrfirescience.org/resource/8284

Broadcast seeding is one of the most commonly used post-fire rehabilitation treatments to establish ground cover for erosion control and mitigation of non-native plant species invasions. Little quantitative information is available on overall trends of post-fire seeding expenditures and seed mixes used over time in forested...

Author(s): Donna Peppin, Peter Z. Fule, Carolyn Hull Sieg, Jan L. Beyers, Molly E. Hunter, Peter R. Robichaud

Year Published: 2011

Type: Document

Book or Chapter or Journal Article, Synthesis

Does seeding after severe forest fires in western USA mitigate negative impacts on soils and plant communities?

www.nrfirescience.org/resource/11501

Broadcast seeding is one of the most widely used post-wildfire emergency response treatments intended to reduce soil erosion, increase vegetative ground cover, and minimize establishment and spread of non-native plant species. However, seeding treatments can also have negative effects such as competition with recovering native...

Author(s): Donna Peppin, Peter Z. Fule, Jan L. Beyers, Carolyn Hull Sieg, Molly E. Hunter

Year Published: 2011

Type: Document

Synthesis, Technical Report or White Paper

Getting results: measuring post-wildfire erosion control treatment effectiveness

www.nrfirescience.org/resource/11031

In the past decade, wildfires around the world have continued to increase in size, severity, and cost. The number of people living in wildland areas has also increased, putting public safety, homes, roads, public infrastructure, water quality, and valued natural resources at risk from wildfire and secondary fire effects. Major...

Author(s): Peter R. Robichaud, Robert E. Brown, Peter M. Wohlgemuth, Joseph W. Wagenbrenner

Year Published: 2011

Type: Document

Conference Proceedings

Post-fire treatment effectiveness for hillslope stabilization

www.nrfirescience.org/resource/12594

This synthesis of post-fire treatment effectiveness reviews the past decade of research, monitoring, and product development related to post-fire hillslope emergency stabilization treatments, including erosion barriers, mulching, chemical soil treatments, and combinations of these treatments. In the past ten years, erosion barrier...

Author(s): Peter R. Robichaud, Louise E. Ashmun, Bruce D. Sims

Year Published: 2010

Type: Document

Synthesis, Technical Report or White Paper

Continued evaluation of post-fire recovery and treatment effectiveness for validation of the ERMiT erosion model (combined proposals P07-2-2-10 and P07-2-3-06) - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11227

The use and cost of post-fire emergency stabilization treatments continues to grow. To help maximize the impact of these treatments, many assessment teams use the Erosion Risk Management Tool (ERMiT) erosion model to predict postfire erosion and mitigation effects. However, despite several completed JFSP projects, the long-term...

Author(s): Peter R. Robichaud, William J. Elliot, Joseph W. Wagenbrenner, Sarah A. Lewis, Louise E. Ashmun, Peter M. Wohlgemuth, Robert E. Brown

Year Published: 2010

Type: Document

Technical Report or White Paper

Post-wildfire seeding in forests of the western United States: an evidence-based review

www.nrfirescience.org/resource/12595

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

Author(s): Donna Peppin, Peter Z. Fule, Carolyn Hull Sieg, Jan L. Beyers, Molly E. Hunter

Year Published: 2010

Type: Document

Book or Chapter or Journal Article, Synthesis

A synthesis of postfire road treatments for BAER teams: methods, treatment effectiveness, and decisionmaking tools for rehabilitation

www.nrfirescience.org/resource/12622

We synthesized post-fire road treatment information to assist BAER specialists in making road rehabilitation decisions. We developed a questionnaire; conducted 30 interviews of BAER team engineers and hydrologists; acquired and analyzed gray literature and other relevant publications; and reviewed road rehabilitation procedures and...

Author(s): Randy B. Foltz, Peter R. Robichaud, Hakjun Rhee

Year Published: 2009

Type: Document

Synthesis, Technical Report or White Paper

Climate and wildfire area burned in western US ecoprovinces, 1916-2003

www.nrfirescience.org/resource/18977

The purpose of this paper is to quantify climatic controls on the area burned by fire in different vegetation types in the western United States. We demonstrate that wildfire area burned (WFAB) in the American West was controlled by climate during the 20th century (1916–2003). Persistent ecosystem-specific correlations between...

Author(s): Jeremy S. Littell, Donald McKenzie, David L. Peterson, Anthony L. Westerling

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Emergency post-fire rehabilitation treatment effects on burned area ecology and long-term restoration

www.nrfirescience.org/resource/12591

The predicted continuation of strong drying and warming trends in the southwestern United States underlies the associated prediction of increased frequency, area, and severity of wildfires in the coming years. As a result, the management of wildfires and fire effects on public lands will continue to be a major land management...

Author(s): Peter R. Robichaud, Sarah A. Lewis, Robert E. Brown, Louise E. Ashmun

Year Published: 2009

Type: Document

Book or Chapter or Journal Article, Synthesis

The increasing wildfire and post-fire debris-flow threat in Western USA, and implications for consequences of climate change

www.nrfirescience.org/resource/18703

In southern California and the intermountain west of the USA, debris flows generated from recently-burned basins pose significant hazards. Increases in the frequency and size of wildfires throughout the western USA can be attributed to increases in the number of fire ignitions, fire suppression practices, and climatic influences....

Author(s): Susan H. Cannon, Jerome DeGraff

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Measuring effectiveness of three postfire hillslope erosion barrier treatments, western Montana, USA

www.nrfirescience.org/resource/8389

After the Valley Complex Fire burned 86 000 ha in western Montana in 2000, two studies were conducted to determine the effectiveness of contour-felled log, straw wattle, and hand-dug contour trench erosion barriers in mitigating postfire runoff and erosion. Sixteen plots were located across a steep, severely burned slope, with a...

Author(s): Peter R. Robichaud, Frederick B. Pierson, Robert E. Brown, Joseph W. Wagenbrenner

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Effectiveness of aerial seeding and straw mulch for reducing post-wildfire erosion, north-western Montana, USA

www.nrfirescience.org/resource/8200

Various methods are available to reduce post-wildfire erosion, but there is limited quantitative information on the relative effectiveness of these techniques. We used rainfall simulations to compare the erosion and runoff rates from adjacent 0.5-m² plots treated with aerial grass seeding and straw mulch with untreated control plots...

Author(s): Amy H. Groen, Scott W. Woods

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Evaluating the effectiveness of contour-felled log erosion barriers as a post-fire runoff and erosion mitigation treatment in the western United States

www.nrfirescience.org/resource/8167

Between 1998 and 2002, six sites were established immediately after large wildfires in the western United States to determine the effectiveness of contour-felled log erosion barriers in mitigating post-

wildfire runoff and erosion. In each pair of matched, burned, and small watersheds (1-13 ha), one was treated with contour-felled...

Author(s): Peter R. Robichaud, Joseph W. Wagenbrenner, Robert E. Brown, Peter M. Wohlgenuth, Jan L. Beyers

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Predicting postfire erosion and mitigation effectiveness with a web-based probabilistic erosion model

www.nrfirescience.org/resource/8138

The decision of where, when, and how to apply the most effective postfire erosion mitigation treatments requires land managers to assess the risk of damaging runoff and erosion events occurring after a fire. To meet this challenge, the Erosion Risk Management Tool (ERMiT) was developed. ERMiT is a web-based application that uses the...

Author(s): Peter R. Robichaud, William J. Elliot, Frederick B. Pierson, David E. Hall, Corey A. Moffet

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Protection from erosion following wildfire

www.nrfirescience.org/resource/11053

Erosion in the first year after a wildfire can be up to three orders of magnitude greater than the erosion from undisturbed forests. To mitigate potential postfire erosion, various erosion control treatments are applied on highly erodible areas with downstream resources in need of protection. Because postfire erosion rates generally...

Author(s): Peter R. Robichaud, William J. Elliot

Year Published: 2006

Type: Document

Conference Proceedings

Fire management impacts on invasive plants in the western United States

www.nrfirescience.org/resource/12024

Fire management practices affect alien plant invasions in diverse ways. I considered the impact of six fire management practices on alien invasions: fire suppression, forest fuel reduction, prescription burning in crown-fire ecosystems, fuel breaks, targeting of noxious aliens, and postfire rehabilitation. Most western United States...

Author(s): Jon E. Keeley

Year Published: 2006

Type: Document

Book or Chapter or Journal Article, Synthesis

Basic principles of forest fuel reduction treatments

www.nrfirescience.org/resource/18976

Successful fire exclusion in the 20th century has created severe fire problems across the West. Not every forest is at risk of uncharacteristically severe wildfire, but drier forests are in need of active management to mitigate fire hazard. We summarize a set of simple principles important to address in fuel reduction treatments:...

Author(s): James K. Agee, Carl N. Skinner

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Assessing the causes, consequences and spatial variability of burn severity: a rapid response proposal - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11149

In this rapid response project, we have collected data on post-fire effects and pre-fire fuels and vegetation from 10 large fires that burned in 2003 and 2004. We use field and remotely sensed data collected during and soon after wildfires to quantify the interactions and spatial variability in fire effects, fuels, fire behavior,...

Author(s): Penelope Morgan, Andrew T. Hudak, Peter R. Robichaud, Kevin C. Ryan

Year Published: 2005

Type: Document

Technical Report or White Paper

Compilation of data relating to the erosive response of 606 recently burned basins in the western U.S.

www.nrfirescience.org/resource/18716

This report presents a compilation of data on the erosive response, debris-flow initiation processes, basin morphology, burn severity, event-triggering rainfall, rock type, and soils for 608 basins recently burned by 53 fires located throughout the Western United States. The data presented here are a combination of those collected...

Author(s): J. E. Gartner, Susan H. Cannon, Erica R. Bigio, Nicole K. Davis, C. Parrett, Kenneth L. Pierce, M. G. Rupert, Brandon L. Thurston, Matthew J. Trebesch, Steve P. Garcia, A.H. Rea

Year Published: 2005

Type: Document

Technical Report or White Paper

Postfire seeding for erosion control: effectiveness and impacts on native plant communities

www.nrfirescience.org/resource/7911

Large, high-severity wildfires remove vegetation cover and expose mineral soil, often causing erosion and runoff during postfire rain events to increase dramatically. Land-management agencies in the United States are required to assess site conditions after wildfire and, where necessary, implement emergency watershed rehabilitation...

Author(s): Jan L. Beyers

Year Published: 2004

Type: Document

Book or Chapter or Journal Article, Synthesis

Postfire management on forested public lands of the western United States

www.nrfirescience.org/resource/7913

Forest ecosystems in the western United States evolved over many millennia in response to disturbances such as wildfires. Land use and management practices have altered these ecosystems, however, including fire regimes in some areas. Forest ecosystems are especially vulnerable to postfire management practices because such practices...

Author(s): Robert L. Beschta, Jonathan J. Rhodes, J. Boone Kauffman, Robert E. Gresswell, G. Wayne Minshall, James R. Karr, David A. Perry, F. Richard Hauer, Christopher A. Frissell

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

A review of prescribed burning effectiveness in fire hazard reduction

www.nrfirescience.org/resource/18713

Wildfire hazard abatement is one of the major reasons to use prescribed burning. Computer simulation, case studies, and analysis of the fire regime in the presence of active prescribed burning programs in forest and shrubland generally indicate that this fuel management tool facilitates fire suppression efforts by reducing the...

Author(s): Paulo M. Fernandes, Herminio S. Botelho

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Quick response small catchment monitoring techniques for comparing postfire rehabilitation treatment effectiveness

www.nrfirescience.org/resource/11000

Increased runoff and erosion commonly occur after wildfires with the onset of precipitation events. Various erosion mitigation treatments are often used after wildfires to reduce flooding and sedimentation. The effectiveness of these treatments has not been well documented in the literature; therefore we undertook a rapid response...

Author(s): Peter R. Robichaud, Robert E. Brown

Year Published: 2003

Type: Document

Conference Proceedings

On the impact of fire suppression and BAER restoration on weeds

www.nrfirescience.org/resource/11043

In 2000, wildfires burned more than 200,000 acres on the Bitterroot National Forest of Montana and nearly 1.5 million acres in the Northern and Intermountain Regions. Management activities associated with fire suppression and post-fire restoration have had the unintentional consequence of promoting invasive weeds. As part of fire...

Author(s): Elaine Kennedy Sutherland

Year Published: 2003

Type: Document

Conference Proceedings

Post-fire erosional processes: In the Pacific Northwest and Rocky Mountain region

www.nrfirescience.org/resource/18693

The objective of this paper is to provide a general overview of the influence of wildland fires on the erosional processes common to the forested landscapes of the western United States. Wildfire can accelerate erosion rates because vegetation is an important factor controlling erosion. There can be great local and regional...

Author(s): Steven M. Wondzell, John G. King

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Spatial and temporal effects of wildfire on the hydrology of a steep rangeland watershed

www.nrfirescience.org/resource/18620

Wildfire is a major ecological process and management issue on western rangelands. The impacts of wildfire on hydrologic processes such as infiltration, runoff, and erosion are not well understood. Small-plot rainfall simulation methods were applied in a rangeland wildfire setting to determine post-fire hydrologic response....

Author(s): Frederick B. Pierson, Peter R. Robichaud, Kenneth E. Spaeth
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Post-fire runoff and erosion from rainfall simulation: contrasting forests with shrublands and grasslands

www.nrfirescience.org/resource/18566

Rainfall simulations allow for controlled comparisons of runoff and erosion among ecosystems and land cover conditions. Runoff and erosion can increase greatly following fire, yet there are few rainfall simulation studies for post-fire plots, particularly after severe fire in semiarid forest. We conducted rainfall simulations...

Author(s): Matthew P. Johansen, Thomas E. Hakonson, David D. Breshears
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Channel characteristics and large organic debris in adjacent burned and unburned watersheds a decade after wildfire

www.nrfirescience.org/resource/18698

Description available at link.

Author(s): Ronald B. Zelt
Year Published: 2001
Type: Document
Conference Proceedings

The influence of forest health and protection treatments on erosion and stream sedimentation in forested watersheds of eastern Oregon and Washington

www.nrfirescience.org/resource/18692

A variety of Forest Health and Protection treatments have been proposed to reduce long-term risks to forests from wildfire, insects, and disease. This review examines the potential effects of these treatments on sediment production in watersheds of eastern Oregon and Washington, USA, channel forming processes, riparian vegetation,...

Author(s): Steven M. Wondzell
Year Published: 2001
Type: Document
Book or Chapter or Journal Article

Initial hydrologic and geomorphic response following a wildfire in the Colorado Front Range

www.nrfirescience.org/resource/18612

A wildfire in May 1996 burned 4690 hectares in two watersheds forested by ponderosa pine and Douglas fir in a steep, mountainous landscape with a summer, convective thunderstorm precipitation regime. The wildfire lowered the erosion threshold in the watersheds, and consequently amplified the subsequent erosional response to shorter...

Author(s): John A. Moody, Deborah A. Martin
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

Evaluating the effectiveness of postfire rehabilitation treatments

www.nrfirescience.org/resource/11194

Spending on postfire emergency watershed rehabilitation has increased during the past decade. A west-wide evaluation of USDA Forest Service burned area emergency rehabilitation (BAER) treatment effectiveness was undertaken as a joint project by USDA Forest Service Research and National Forest System staffs. This evaluation covers...

Author(s): Peter R. Robichaud, Jan L. Beyers, Daniel G. Neary

Year Published: 2000

Type: Document

Technical Report or White Paper

What happened after the smoke cleared: Onsite erosion rates after a wildfire in Eastern Oregon

www.nrfirescience.org/resource/18644

Recent fires have renewed interest in fire's effect on different components of the ecosystems, particularly erosion and soil productivity. Our objectives were to (1) determine hillslope erosion rates after a high severity wildfire in an unmanaged forest stand; (2) determine fire's short-term effects on nutrient loss. The study site...

Author(s): Peter R. Robichaud, Robert E. Brown

Year Published: 1999

Type: Document

Conference Proceedings

Stochastic forcing of sediment supply to channel networks from landsliding and debris flow

www.nrfirescience.org/resource/18700

Sediment influx to channel networks is stochastically driven by rainstorms and other perturbations, which are discrete in time and space and which occur on a landscape with its own spatial variability in topography, colluvium properties, and state of recovery from previous disturbances. The resulting stochastic field of sediment...

Author(s): Lee E. Benda, Thomas Dunne

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

Hydrologic and erosional responses of a granitic watershed to helicopter logging and broadcast burning

www.nrfirescience.org/resource/18600

Forest land managers are concerned about the effects of logging and site preparation on erosion, site productivity, streamflow, and water quality. Effects of helicopter logging and prescribed burning on streamflow and sediment yields from headwater drainages in the Idaho Batholith were evaluated, using paired watersheds monitored...

Author(s): Walter F. Megahan, John G. King, Kathleen A. Seyedbagheri
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

Vegetal recovery following wildfire in seeded and unseeded sagebrush steppe

www.nrfirescience.org/resource/11459

Following an August wildfire, sagebrush (*Artemisia L.*)/grass benchlands adjacent to Pocatello, Ida., were seeded with a mixture of exotic wheatgrasses and forbs by rangeland drill in November 1987. The effects of seeding on vegetation development in the immediate postfire years were evaluated by comparing plant density, vegetal...

Author(s): Teresa D. Ratzlaff, Jay E. Anderson
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

A simple definition of a landslide

www.nrfirescience.org/resource/18711

A landslide is the movement of a mass of rock, earth or debris down a slope.

Author(s): David Milne Cruden
Year Published: 1991
Type: Document
Book or Chapter or Journal Article

Predicting deposition of debris flows in mountain channels

www.nrfirescience.org/resource/18702

An empirical model for predicting deposition of coarse-textured debris flows in confined mountain channels is developed based on field measurements of 14 debris flows in the Pacific Northwest, U.S.A. The model uses two criteria for deposition: channel slope (less than 3.5°) and tributary junction angle (greater than 70°). The...

Author(s): Lee E. Benda, Terrance W. Cundy
Year Published: 1990
Type: Document
Book or Chapter or Journal Article

Runoff and soil loss following the 1988 Yellowstone fires

www.nrfirescience.org/resource/18589

abstract available at link but unable to capture.

Author(s): Richard A. Marston, David H. Haire
Year Published: 1990
Type: Document
Book or Chapter or Journal Article

Sediment routing by debris flow

www.nrfirescience.org/resource/18487

Forty-six debris flows in a fifth-order basin in the Oregon Coast Range, U.S.A., were studied to determine the role and significance of debris flows in sediment routing. Dating of charcoal from basal colluvium in three bedrock hollows and in one first-order channel yielded an average landslide recurrence interval of approximately...

Author(s): Lee E. Benda, Thomas Dunne

Year Published: 1987
Type: Document
Conference Proceedings

The Sleeping Child Burn - 21 years of postfire change

www.nrfirescience.org/resource/11961

In early August 1961, more than 26,000 acres (10,500 ha) of upper montane and subalpine forest on the Bitterroot National Forest burned in a lightning-caused wildfire. At the time, the Sleeping Child Burn represented the single largest forest fire in the Northern Rocky Mountains in more than 20 years.

Historically, large wildfires...

Author(s): L. Jack Lyon

Year Published: 1984

Type: Document

Technical Report or White Paper

Fire and geomorphic processes

www.nrfirescience.org/resource/18669

Fire, geomorphic processes, and landforms interact to determine natural patterns of ecosystems over landscapes. Fire alters vegetation and soil properties which change soil and sediment movement through watersheds. Landforms affect fire behavior and form firebreaks which determine burn boundaries. Geomorphic consequences of fire in...

Author(s): Frederick J. Swanson

Year Published: 1981

Type: Document

Conference Proceedings

Plant nutrients and soil losses in overland flow from burned forest clearcuts

www.nrfirescience.org/resource/18531

No description found

Author(s): Norbert V. DeByle, P.E. Packer

Year Published: 1972

Type: Document

Conference Proceedings

Rice straw mulch for post-fire erosion control: assessing non-target effects on vegetation communities

www.nrfirescience.org/resource/22074

Straw mulch is commonly used for post-fire erosion control in severely burned areas but this practice can introduce non-native species, even when certified weed-free straw is used. Rice straw has recently been promoted as an alternative to wheat under the hypothesis that non-native species that are able to grow in a rice field are...

Author(s): Kristen L. Shive, Becky L. Estes, Angela M. White, Hugh Safford, Kevin L. O'Hara, Scott L. Stephens

Type: Document

Book or Chapter or Journal Article