



NORTHERN ARIZONA
UNIVERSITY

Ecological Restoration Institute



Dr. Wally Covington takes reporters into the field at the experimental forest in Gus Pearson Natural Area.

Dr. Wally Covington on Reveal Podcast

This past summer, reporters from the Center for Investigative Reporting (CIR) visited the Ecological Restoration Institute (ERI) at Northern Arizona University for a story on wildfires. ERI Executive Director Dr. Wally Covington took the team of journalists and radio producers to Gus Pearson Natural Area, an experimental forest north of Flagstaff, Arizona for a crash course on the science of restoration.

Dr. Covington's interview appears on the nationally syndicated Reveal podcast, which is produced by the CIR. The episode is titled "[America's ring of fire](#)" and is a deep dive into the growing fire problem throughout the West. It examines how wildfires got so dangerous and how communities are working to protect themselves. A complementary print piece, "[When spark meets sprawl: Building](#)

[in wildlands increases fire risk](#),” includes a 360-degree video of a thinning project by the City of Flagstaff’s Wildland Fire Management. Both the podcast and article spotlight work at national and local levels to protect communities from wildfire and create healthy, resilient forests.

Recent Publications

JOURNAL ARTICLES

Covington, W.W., and D. Vosick. 2016. [Restoring the Sustainability of Frequent-Fire Forests of the Rocky Mountain West](#). *Arizona State Law Journal*, 48, 11-33.

This paper discusses the causes of forest health decline and advocates for ecological restoration as an approach for restoring forest health. It also summarizes recent policy changes with the stated purpose to accelerate restoration and provide economic validation for why restoration is the smartest approach for reducing the threat of catastrophic fire.

Hjerpe, E., Y.S. Kim, and L. Dunn. 2016. [Forest density preferences of homebuyers in the wildland-urban interface](#). *Forest Policy and Economics*, 70: 56–66.

Researchers studied the influence of surrounding forest density on house prices in the wildland-urban interface (WUI) in four western U.S. communities with high wildfire risk.

Kalies, E.L., K.A. Haubensack, and A.J. Finkral. 2016. [A meta-analysis of management effects on forest carbon storage](#). *Journal of Sustainable Forestry*, DOI: 10.1080/10549811.2016.1154471.

Ecologists used systematic review methodology to identify and synthesize effects of thinning and/or burning, timber harvesting, clear-cutting practices, and wildfire on four components of ecosystem carbon: aboveground vegetation, soil, litter, and deadwood.

Kalies, E.L. and L.L. Yocom Kent. 2016. [Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review.](#) *Forest Ecology and Management*, 375: 84–95.

This systematic review of relevant literature sought to answer the question of whether fuel treatments are effective at achieving ecological (restoring ecosystem structure, composition, and function) and social (saving human lives and property) objectives.

Rodman, K.C., A.J. Sánchez Meador, D.W. Huffman, and K.M. Waring. [Reference conditions and historical fine-scale spatial dynamics in a dry mixed-conifer forest, Arizona, USA.](#) *Forest Science*, 62(3):268–280.

To improve the knowledge of ecosystem dynamics within frequent-fire forests and to develop targets for forest restoration, researchers used dendrochronological reconstructions and spatial analyses to quantify historical and contemporary tree densities, species compositions, and fine-scale spatial patterns in dry mixed-conifer forests of the Mogollon Rim, Arizona.

Strahan, R.T., D.C. Laughlin, J.D. Bakker, and M.M. Moore. 2015. [Long-term protection from heavy livestock grazing affects ponderosa pine understory composition and functional traits.](#) *Rangeland Ecology and Management*, 68(3): 257–265.

In this study, ecologists reanalyzed data from a unique long-term study to determine vegetation responses to continued heavy livestock grazing and recovery patterns when livestock were excluded for 30 years (1912–1941).

Strahan, R.T., A.J. Sánchez Meador, D.W. Huffman, and D.C. Laughlin. 2016. [Shifts in community-level traits and functional diversity in a mixed conifer forest: a legacy of land-use change.](#) *Journal of Applied Ecology*, doi:10.1111/1365-2664.12737.

Long-term changes in stand-level functional traits are not as well understood as changes in forest structure and composition. The objective of this study was to assess century-long changes in overstory forest composition, structure, and functional diversity in a warm/dry mixed conifer forest. Researchers analyzed four traits that reflect important characteristics of species adapted to semi-arid, frequent-fire ecosystems.

Vosick, D. 2016. [Democratizing Federal Forest Management Through Public Participation and Collaboration](#). *Arizona State Law Journal*, 48, 93-109.

This paper explores how public participation and collaboration in federal forest management has evolved over the last century.

FACT SHEETS

Hjerpe, E. 2016. [Forest Density Preferences of Homeowners in the Wildland-Urban Interface](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 2 p.

This fact sheet summarizes findings from a study that examined the influence of forest density on house prices in the wildland-urban interface (WUI).

WORKING PAPERS

O'Donnell, F.C. 2016. [The Influence of Restoration Treatments on Hydrologic Output in Fire-Adapted Forests of the Southwest](#). ERI Working Paper No. 37. Ecological Restoration Institute and the Southwest Fire Science Consortium, Northern Arizona University. 14 p.

This working paper summarizes research relevant to understanding the effect of restoration treatments on the hydrologic cycle of southwestern forests. It presents an overview of forest hydrology in the Southwest followed by discussions of forest restoration and wildfire effects on water quantity, water quality, and hydrologic function.

GENERAL AND TECHNICAL REPORTS

Evans, A.M. 2016. [2015 Wildfire Season: An Overview, Southwestern U.S.](#) Flagstaff, AZ: Ecological Restoration Institute and Southwest Fire Science Consortium, Northern Arizona University. 13 p.

This report covers the temporal period of 2015, fire management costs, vegetation types, previous burn footprints, and burn severity for the 12 largest fires in Arizona and New Mexico. In 2015, the largest 12 fires burned 125,746 acres, or 62 percent of the total number of acres burned by wildfire in the Southwest in 2015.

News from the Field



Measuring plots during the 2016 summer field season.

ERI Science Delivery and Outreach News

By Amy Waltz, Director of Science Delivery

The ERI continued to conduct outreach with our southwestern region's forests in 2016, but also reorganized to combine agency outreach with our broader science delivery to West-wide and national audiences. A few highlights across this broad program of work include:

National Collaboration Restoration Workshop, Denver, CO, April 2016.

The ERI worked closely with the National Forest Foundation (NFF) and the U.S. Forest Service (USFS) Washington Office to sponsor and provide guidance on the workshop steering committee and specific topical tracts for this workshop. Outcomes can be found hosted by the NFF [online](#).

USFS Region 2 and 3 Broader-Scale Monitoring Project. The ERI worked with our sister institutes in Colorado and New Mexico, and USFS Regions 2 and 3 to develop a framework for a Broader-Scale Monitoring Strategy. This is a new element of the 2012 planning rule and requires regions to monitor at scales broader than one administrative unit.

Four Forest Restoration Initiative (4FRI) Science and Planning Support.

ERI Science Delivery staff, with our Policy and Partnership and Research and Development staff, all work to support the 4FRI collaborative stakeholder process and USFS planning team providing stakeholder leadership support (co-chair and small-group chairs) and technical support to identify monitoring needs and fill monitoring gaps. We continue to work closely to assess the implementation of the first Environmental Impact Study area, while contributing science support to the second planning area.

Forest Projects. The ERI science delivery team worked closely with USFS Region 3 forests on a variety of project-level questions and science needs assessments. Together with USFS staff, the ERI worked on a treatment comparison on the Coconino National Forest; pre-project assessments on the Apache-Sitgreaves and Prescott national forests; and restoration demonstration sites on the Coronado and Carson national forests. We also are working with the forest planning process on the Tonto National Forest.



ERI research ecologists collect understory data during the 2016 summer field season.

Research and Development

2016 Summer Field Season Overview

By ERI R&D Staff

In partnership with the U.S. Forest Service, ERI field crews collected data on three studies that will greatly enhance our knowledge of ecosystems following wildfire and managed fires. On the fifth anniversary of the Wallow Fire, the largest wildfire in Arizona history, we teamed up with the Apache-Sitgreaves National Forest to determine if fuel reduction treatments in dry mixed-conifer forests prior to the fire had a measurable effect on ecosystem attributes such as tree survival and regeneration, resistance to attacks by pine bark beetles, fuel loadings and changes in the plant community.

Field crews spent much of the summer on the Tusayan Ranger District of the Kaibab National Forest collecting data on a 30,000-acre landscape that has experienced multiple, overlapping naturally ignited wildfires (managed wildfires) over much of the area. These data, combined with data collected last year on single fire areas in the same landscape, will be used to test the efficacy of managed wildfires in meeting forest restoration goals.

Twenty-four plots, originally installed and measured prior to the 2001 Leroux Fire, were remeasured. This was the second time these plots have been remeasured since the fire, giving us pre-fire, one-year and 15-year post-fire data. Little is known about the long-term dynamics of burned-over mixed-conifer forests. The data that were collected will help to better understand how

fire severity and climate interact to affect changes in species composition and vegetation structure.

Partner Spotlight



GRAND CANYON
TRUST

Grand Canyon Trust

The mission of the Grand Canyon Trust is to protect and restore the Colorado Plateau — its spectacular landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude. The Grand Canyon Trust and ERI have worked together as collaborative partners on the Four Forest Restoration Initiative and both are dedicated to the restoration of fire-adapted landscapes. The Grand Canyon Trust has a robust volunteer program, which has recently been [collecting watershed data](#) for 4FRI. To learn more about the Grand Canyon Trust, visit their [website](#).



NAU is an equal opportunity provider.

ERI's research is funded by many sources, including the USDA Forest Service and the AZ Board of Regents through the Technology, Research and Innovation Fund (TRIF).

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