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ERI's Spring / Summer 2014 Newsletter

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UNIVERSITY****Ecological Restoration Institute**

Recent Publications



Working Paper 30: Impact of Forest Restoration Treatments on Southwestern Ponderosa Pine Tree Resistance to Bark Beetles.

ERI Spring / Summer 2014 Newsletter

A 4-Year Look: Lessons Learned from the Southwest Regions' Five Collaborative Forest Landscape Restoration (CFLR) Projects

Stakeholders and Forest Service personnel from the Uncompahgre Plateau, Colorado Front Range, Southwest Jemez Mountains, Zuni Mountain Project, and Four Forest Restoration Initiative CFLR sites convened in the fall of 2013 for three days of cross-project learning, field trips and discussions on the challenges and solutions to restoring forests at the landscape scale. The meeting was hosted by the Uncompahgre Plateau collaborators, who also shared one of the most interesting stories of collaboration. Their partnership hasn't had any appeals or litigation on collaboratively developed projects. They attribute this to three factors: A strong relationship between the stakeholders and the Forest Service, their collaboratively developed "Restoration Principles" and, finally, lots of time together in the field.

At the conclusion of the meeting, the participants developed recommendations that would improve



Fact Sheet: Managing Naturally Ignited Wildland Fire to Meet Fuel Reduction and Restoration Goals in Frequent-Fire Forests.

Recent News

[Ahead Of Wildfire Season, Scientists Study What Fuels Fires](#) - NPR - All Things Considered

[Arizonans leverage local resources to prevent wildfire](#) - The Goat Blog

[4FRI not yet out of woods](#) - Arizona Daily Sun

[4FRI seen as last, best chance](#) - Arizona Daily Sun

[Forest Service vows to expand projects](#) - Capital Ag Press

[Coconino Voices: Local watershed thinning a national example](#) - Arizona Daily Sun

[The thinner the better in Flagstaff to fight wildfires](#) - Arizona Daily Sun

[Study: Forest Fuel Reduction Cheaper Than](#)

CFLRP implementation.

- **Greater USFS regional office involvement:** Increased communication and engagement is needed between the projects and the regional offices.
- **Improve monitoring and adaptive management policies:** The Forest Service should standardize land management guidance on adaptive NEPA, multi-party monitoring, and data management. Legal and procedural guidelines should be created that outline how stakeholders and land managers can revise desired conditions within a signed NEPA decision, based on monitoring results and adaptive management.
- **Support private industry to carry out restoration:** Private industry remains essential to carrying out publically funded projects that are reducing fire risk for communities across the arid Southwest and lowering the cost of suppressing wildfires. However, the timelines, locations and appropriations for planning restoration treatments on national forests are often out of synch with those required by private sector industry to effectively complete restoration treatments. To solve this problem the USFS could use the CFLR collaborative framework to directly incorporate industry needs into the project planning process.
- **Reduce budgetary “borrowing” problems:** Currently CFLR projects are partially funded by redirecting dollars from other forests and forest management activities, contrary to the CFLR’s original intent to be *in addition* to base budgets. This has led to shortfalls and problematic “borrowing” from other forest management activities in order to accomplish CFLR management objectives. Adequate

[Fighting Fires](#) - Capitol Public Radio

[Arizona's U.S. Senators Request Wildfire Help from Federal Government](#) - KNAU

[Bark beetles are winning, and that's bad for wildfires](#) - Arizona Republic

[Arizona wildfires: How bad will they be?](#) - Arizona Republic

[More news...](#)

Upcoming Events

[Large Wildland Fires: Social, Political & Ecological Effects](#)
Association for Fire Ecology /International Association of Wildland Fire
Missoula, MT
May 19–23, 2014

[SmallWood Conference](#)
“Forest Utilization and Management: From Working Woodlands to City Streets”
Rochester, MN
June 3–5,
2014

[Prescribed Fire Training Exchange](#)
Arizona Prescribed Fire Council, Fire Learning Network, SWFSC and other partners
Flagstaff, AZ
September 23–October 4,
2014

funding is needed to support both the CFLR projects and base budget activities.

View the full [workshop summary](#).

ERI Publications: December 2013– May 2014

FACT SHEETS

Kalies, E.L. 2014. [Stand Structure and Breeding Birds: Implications for Restoring Ponderosa Pine Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 2 p.

These wildlife ecologists sampled birds and forest structural characteristics in 23 stands in northern Arizona. Using multi-season and multi-species occupancy models, their results suggest that restoration treatments will likely benefit a substantial portion of the breeding songbird community.

Kalies, E.L. 2014. [What Are the Consequences of Cutting Old Ponderosa Pine Trees? A Systematic Review](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 3 p.

Dr. Kalies used systematic review methodology to find out whether old Ponderosa pine trees serve a different function than younger trees. Studies with a high weight of evidence pointed to positive effects of old trees on ecosystem properties.

Lucas, A.M., Y.S. Kim, E.J. Davis, C. Moseley, M.

Nielsen-Pincus, T. Bilek. 2014. [The Impacts of the Woody Biomass Utilization Program in Eastern Arizona](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 2 p.

Based on a larger study, this fact sheet examines the accomplishments of the Woody Biomass Utilization Grant (BUG) program and its contributions to the revival of eastern Arizona's biomass processing capacity and associated economic development.

O'Donnell, F. 2014. [Estimating the Effect of Forest Restoration on Water Resources in Northern Arizona](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University, Flagstaff, AZ. 2 p.

Researchers used mathematical modeling to estimate the increase in streamflow following restoration thinning treatments.

Sensibaugh, M., and D.W. Huffman. 2014. [Managing Naturally Ignited Wildland Fire to Meet Fuel Reduction and Restoration Goals in Frequent-Fire Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 3 p.

Depending on a variety of factors, naturally ignited wildfires can be managed to achieve resource objectives. This fact sheet provides a brief overview of policy guidelines, benefits, costs, and constraints of this approach for meeting fuels reduction and restoration objectives.

Springer, J.D. 2014. [Ecology of Rusby's Milkvetch](#)

[\(*Astragalus rusbyi*\), a Rare Endemic of Northern Arizona Ponderosa Pine Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 2 p.

*These forest ecologists present findings from previous research on Rusby's milkvetch (*Astragalus rusbyi*) to determine what the science says about the plant's responses to tree thinning and prescribed burning.*

Springer, J.D. 2014. [Long-Term Responses of *Penstemon Clutei* \(Sunset Crater beardtongue\) to Root Trenching and Prescribed Fire: Clues for Population Resistance](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 2 p.

*Forest ecologists present findings from a study that tested the responses of *Penstemon clutei* (Sunset Crater beardtongue) to restoration treatments (prescribed fire and trenching) and evaluated the importance of a persistent seed bank in population dynamics. The research suggests that long-term monitoring is needed for future conservation management of this species.*

Springer, J.D. 2014. [Post-Wildfire Restoration of Structure, Composition, and Function in Southwestern Ponderosa Pine and Warm-Dry Mixed-Conifer Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 3 p.

Since there is less information currently available on long-term, post-fire restoration efforts than emergency stabilization activities, this fact sheet examines how

each attribute of an ecosystem—resilience, forest structure, composition, function, physical environment, and landscape context and integrity—is enhanced by restoration activities after a catastrophic wildfire.

Springer, J.D. 2014. [Soil Seed Banks in a Mature Coniferous Forest Landscape: Dominance of Native Perennials and Low Spatial Variability](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 2 p.

Forest ecologists evaluate the composition and relationships of seed banks with forest community types, vegetation cover, and environmental variables from 36 relatively undisturbed sites ranging from low-elevation pinyon-juniper to high-elevation bristlecone pine in southern Nevada.

Stempniewicz, V. 2014. [Sediment Yield After Severe Wildfire](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University, Flagstaff, AZ. 2 p.

This fact sheet summarizes findings on sediment transport and erosion on burned landscapes in ponderosa pine and mixed conifer type vegetation. It uses the 2010 Schultz Fire as an example of a high-severity wildfire with post-fire runoff flows twice as high as pre-fire flows.

Yarborough, R.F. 2014. [Summer Habitat Use by Adult Female Mule Deer in a Restoration-Treated Ponderosa Pine Forest](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University:

Flagstaff, AZ. 2 p.

Wildlife research biologists present findings from a study that examines effects of restoration treatments on summer habitat-use patterns of female mule deer. Researchers found that maintaining a surface fire regime stimulates herbaceous understory vegetation, providing an important dietary component for mule deer.

JOURNAL ARTICLES

Abella, S.R., C.W. Denton, R.W. Steinke, and D.G. Brewer. 2013. [Soil development in vegetation patches of *Pinus ponderosa* forests: interface with restoration thinning and carbon storage.](#) *Forest Ecology and Management* 310:632-642.

Ecologists sampled 48 soil profiles in three vegetation types at eight sites in northern Arizona ponderosa pine forests to help inform thinning prescriptions. Results suggest that soil development patterns should be considered when choosing which trees to leave on the landscape during thinning operations.

Horncastle, V.J., R.F. Yarborough, B.G. Dickson, and S.S. Rosenstock. 2013. [Summer habitat use by adult female mule deer in a restoration-treated ponderosa pine forest.](#) *Wildlife Society Bulletin*, 37(4):707–713.

These wildlife ecologists examined the effects of restoration treatments on summer habitat-use patterns of female mule deer. The results suggest mule deer benefit from a frequent surface fire regime that stimulates herbaceous understory vegetation, which provides an important dietary component for the deer in the summer months.

Kurth, V.J., S.C. Hart, C.S. Ross, J.P. Kaye, and P.Z. Fulé. 2014. [Stand-replacing wildfires increase nitrification for decades in southwestern ponderosa pine forests](#). *Oecologia* DOI: 10.1007/s00442-014-2906-x.

Kurth and others examined the long-term dynamics of net and gross nitrogen transformations after stand-replacing wildfires. The results suggest that stand-replacing wildfires trigger a shift in nitrogen cycling for at least 30 years.

Mueller, J.M. 2014. [Estimating willingness to pay for watershed restoration in Flagstaff, Arizona using dichotomous-choice contingent valuation](#). *Forestry*, 87(2): 327-333.

Economist Dr. Julie Mueller found that the average Flagstaff household was willing to pay approximately \$4.89 a month to fund restoration efforts and protect watersheds in and around their community.

Peppin, D.L., A.L. Mottek-Lucas, and P.Z. Fule. 2014. [Post-fire seeding in western United States forests: perspectives of resource managers](#). *Fire Ecology* 10:31–42.

Peppin and others surveyed and interviewed land managers directly involved in post-fire seeding activities to determine if they felt there was sufficient available information on the long-term effects of seeding. They found that 71% felt it was not sufficient.

Wyatt, C.J.W., F.C. O'Donnell, and A.E. Springer.

2014. [Semi-arid aquifer responses to forest restoration treatments and climate change](#).

Groundwater, doi:10.1111/gwat.12184.

Researchers used an interpretive modeling approach to assess the impact of 4FRI treatments and changing climatic conditions on regional aquifers.

WORKING PAPERS

Springer, J.D. 2013. [Post-Wildfire Restoration of Structure, Composition, and Function in Southwestern Ponderosa Pine and Warm/Dry Mixed-Conifer Forests](#). ERI Working Paper 29. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 9 p.

Springer reviewed the current literature on post-wildfire forest restoration and identified challenges and opportunities for management of severely burned large patches. Based on these findings, the paper develops principles for restoring forests that have been burned by high-severity wildfires.

Gaylord, M.L. 2014. [Impact of Forest Restoration Treatments on Southwestern Ponderosa Pine Tree Resistance to Bark Beetles](#). ERI Working Paper 30. Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 9 p.

This working paper examines the relative literature on the effects of tree thinning and prescribed fire on bark beetle activity and offers management recommendations based on the findings.

GENERAL AND TECHNICAL REPORTS

Evans, A.M. 2014. [2013 Wildfire Season: An Overview, Southwestern U.S.](#) Ecological Restoration

Institute and Southwest Fire Science Consortium,
Northern Arizona University: Flagstaff, AZ. 12 p.

The report describes vegetation impacted by each of the past year's largest fires in Arizona and New Mexico and the degree to which the fires affected resources like soils, vegetation, and structures. The report serves as a source of information on the 2013 fire season and elaborates beyond "acres burned."

Springer, J.D. 2013. [Prolonged vegetative dormancy in rare plant species of the Southwest](#). The Plant Press, Arizona Native Plant Society. Fall Newsletter, 2013.

ERI's Judy Springer details a strategy for rare plant species that considers the phenomenon of prolonged vegetative dormancy when conducting demographic studies or plant viability analyses.

News from the Field



Understory plant community conditions will be recorded 10 years after restoration treatments at a pinyon-juniper study site.

ERI Research

The upcoming field season promises to be a full one for ERI staff and summer field technicians. Several new projects will be initiated to examine ecosystem responses to restoration and hazardous fuels reduction treatments.

This summer the ERI will be establishing a new long-term study of restoration of mixed conifer forests near the Mogollon Rim on the Coconino National Forest. This work will be part of the ERI's [Long-term Ecological Assessment and Restoration Network](#) (LEARN), and used to broadly assist restoration planning for this important and diverse ecosystem. Complementing this study, the ERI will support the graduate research of Kyle Rodman, who will reconstruct the spatial patterns of mixed conifer trees and tree groups that existed prior to historical exclusion of frequent surface fire.

On the Kaibab National Forest, the ERI will begin monitoring long-term effects of restoration on hydrological and other ecosystem responses in a collaborative project with Salt River Project. This research will provide new watershed level information and can be used to track outcomes of the Four Forest Restoration Initiative (4FRI) project. In another collaboration, the ERI will begin monitoring changes in mixed conifer forest structure and potential fire behavior on sites treated as part of the Flagstaff Watershed Protection Project (FWPP). Data from this study, along with responses of Mexican spotted owl populations recorded by the U.S. Fish and Wildlife Service, will be used to inform adaptive management of spotted owl Protected Activity Centers (PACs).

Lastly, understory plant community conditions will be recorded at a pinyon-juniper woodland study site,

where restoration treatments were done 10 years ago.



Restoration treatment alternatives will be studied in overly dense mixed conifer forests.

Agency Outreach

The mild winter weather of 2013-2014 enabled ERI's Outreach group to continue data collection and analysis on several key U.S. Forest Service projects in the Southwestern Region. The group also participated in various CFLRPs and provided science support to restoration implementation efforts. A few highlights include:

Pineleno Ecosystem Restoration Project — Safford Ranger District (RD), Coronado NF: Design and layout of a Restoration Demonstration Area that will be harvested in 2015 and feature an interpretive trail system through a mixed conifer vegetative ecosystem that has active Red squirrel middens and a unique management and fire history.

Mixed conifer LEARN study plots — Mogollon Rim RD, Coconino NF: Together with ERI's research and development group, initiated identification of potential long-term study sites that will provide information about treatment alternatives in Mexican spotted owl (MSO) habitat located in mixed conifer ecosystems.

Prescott NF MSO Habitat Treatment Study — Bradshaw RD, Prescott NF: Initiated studies to determine historical reference conditions in MSO PACs and CORE areas, focusing on treatment alternatives and the role of fire in these areas.

“Bridge the Gap” Restoration Projects Monitoring Plan – Apache-Sitgreaves NF: Participation in developing a forest-wide Monitoring Plan for multiple restoration projects. This Monitoring Plan will guide the monitoring and adaptive management efforts on 20,000 acres annually for the Bridge Projects within the second 4FRI analysis area, until the 4FRI NEPA process is completed and resultant strategies are implemented.



Arizona Prescribed Fire Council: ERI assisted several other partners in Arizona to establish a council to help provide education and implementation of prescribed fire in Arizona. For more info visit azprescribedfirecouncil.org.

For additional information on ERI’s Outreach program, please contact Bruce Greco, Director of Outreach, (928) 523-4663 or bruce.greco@nau.edu.

Partner Spotlight



**W.A. Franke College of Business and the
Arizona Rural Policy Institute**

The W.A. Franke College of Business (FCB) at Northern Arizona University is on the cutting edge of business schools in Arizona. It is also home to the Arizona Rural Policy Institute (RPI), which is one of four units of the Alliance Bank Business Outreach Center, authorized and funded in part by the U.S. Department of Commerce Economic Development Administration. RPI leverages the vast capabilities of NAU staff, students, facilities, research entities, and other resources to publish research outcomes in policy reports, surveys, and economic impact studies and provides technical assistance to communities for policy implementation.

The ERI has partnered with the Arizona Rural Policy Institute and the W.A. Franke College of Business on several research projects examining the local and regional economic impacts of U.S. Forest Service stewardship contracting as well as the full cost accounting of catastrophic wildfires. Recent white papers that resulted from this work include [“A Full Cost Accounting of the 2010 Schultz Fire”](#) and [“Workforce Needs of the Four Forest Restoration Initiative Project: An Analysis.”](#) RPI is also currently working on a cost avoidance study with ERI and other stakeholders for the Flagstaff Watershed Protection Project, which was put in place by a recent bond issue approved by the citizens of Flagstaff.

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