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ERI November 2014 Newsletter

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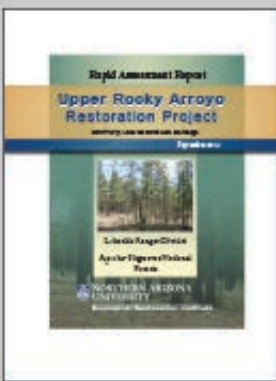
NORTHERN ARIZONA UNIVERSITY

Ecological Restoration Institute

Recent Publications



Fact Sheet: Effects of Tree Cutting and Fire on Understory Vegetation in Mixed Conifer Forests.



Rapid Assessment Report: Upper Rocky Arroyo Restoration Project,

ERI November 2014 Newsletter



ERI Awarded Super Bowl Host Committee Grant

The Arizona Super Bowl Host Committee and the NFL Foundation awarded \$205,000 to the Ecological Restoration Institute as part of the community campaign for Super Bowl XLIX, taking place February 2015 in Glendale.

“The importance of the Super Bowl legacy grant is that it will help ERI leverage existing funds from the Salt River Project and other sources to continue our work on the long-term effects of forest restoration on watershed health,” said ERI’s Executive Director Dr.

Lakeside Ranger District,
Apache-Sitgreaves National
Forests

Recent News

[City and NAU team up to study owls](#) -- Arizona Daily Sun

[California burning points to more intense wildfires](#) -
- Climate News Network

[Wildfire Prevention Costs Far Less Than Fires \(Op-Ed\)](#) -- Live Science

[The Two Wildfires Everyone Should Be Talking About \(Op-Ed\)](#) -- Live Science

[More news...](#)

Wally Covington Student Travel Award

Two NAU School of Forestry alumni and renowned forest ecologists in their own right announced the establishment of the Wally Covington Student Travel Award to pay tribute to Dr. Covington's influence on their careers.

Drs. Dan Binkley and Mike Ryan studied with Dr. Covington, NAU Regents' Professor and Executive Director of ERI, in the 1970s. Drs. Binkley and Ryan say the travel fund will provide opportunities

Wally Covington.

The grant money given to ERI will have lasting impacts and will support many students conducting field work on this project. It is important for the university and the state of Arizona in helping to protect local and statewide water supplies through landscape-scale restoration approaches.

For more on the legacy grants, click [here](#).

News from the Field

Research and Development – 2014 Summer Field Season Data Collection

By Joe Crouse, Applications Systems Analyst, Sr.



Flagstaff Watershed Protection Project (FWPP)

Peaks Ranger District, Coconino, NF: The goal of this project is to monitor changes in Mexican spotted owl (MSO) habitat, or Protected Activity Centers (PACs), primarily in mixed conifer forests on roughly 11,000 acres around Dry Lake Hills and Mormon Mountain. In partnership with the U.S. Fish and Wildlife Service, which will be monitoring the owls, our research will help determine treatment effects on MSOs within the areas of the FWPP project.

for students to travel to conferences, workshops and other professional opportunities.

Gus Pearson Natural Area

Fort Valley Experimental Forest, USDA Forest Service: This area is home to one of the oldest ongoing forest restoration studies in the Southwest. This summer, understory cover estimates and biomass collection was completed on 55 plots. Overstory stand conditions and surface fuels were also remeasured prior to a planned prescribed fire. These data help scientists and managers understand long-term responses of different forest thinning treatments.

Mixed Conifer Reference Conditions

Mogollon Ranger District, Coconino NF: This project will characterize presettlement spatial patterns of trees in southwestern mixed conifer forests. The objective of this study is to provide a greater understanding of the historical range of variability of frequent-fire forests in the Southwest and provide information for developing restoration prescriptions in mixed conifer forests. Four plots, each 2.5 acres, were inventoried for stand reconstruction analysis.

Mogollon

Mogollon Ranger District, Coconino NF: Little information exists on ecological outcomes to treatments within MSO PACs using Recovery Plan guidelines. In this new LEARN (Long-term Ecological Assessment and Restoration Network) project, the ERI is establishing a rigorous, controlled and replicated study where ecological responses to an evidence-based restoration treatment and a MSO PAC treatment will be monitored. Over the summer, 18 proposed treatment units were sampled.

Mount Trumbull Pinyon-Juniper Demo

Grand Canyon-Parashant National Monument, Bureau of Land Management: This restoration

demonstration project is intended to increase our understanding of the response of overstory structure, vegetation and hazardous fuels in pinyon-juniper woodlands to treatments. The overstory was treated in 2003 and the understory was seeded with native plant species in 2004. Data gathered 10 years after treatment allows us to assess long-term responses to an evidence based restoration treatment. This field season, crews remeasured overstory structure, fuel loading and understory plant communities at the demo sites.

Salt River Project (SRP)

Williams Ranger District, Kaibab NF: During the 2014 field season, the ERI initiated a study funded by SRP to quantify changes in forest structure, fuels, understory communities, and potential fire behavior on watersheds that will be treated under 4FRI. The primary focus of the project is to provide critically needed information concerning water balance responses to forest restoration treatments.

White Mountain Stewardship (WMS) Project

Apache-Sitgreaves, NF (ASNF): In 2004 the ASNF awarded a stewardship contract to Future Forest, LLC to thin 150,000 acres of degraded ponderosa pine forests in the White Mountains of Arizona over 10 years. In 2011, ERI contracted with the ASNF and the WMS Monitoring Board to address prioritized ecological monitoring questions. During the 2014 field season, crews completed monitoring of 91 plots across 20 cutting units. These plots complement the plots installed during the 2012 and 2013 field seasons. Findings from analysis of 2012 and 2013 data indicated a reduction in canopy fuel loading and potential fire behavior and untreated and lightly treated patches were found to be small and scattered, and also revealed no evidence that landings and

slash piles had more invasive species than other microsites. This year was the last year of the project and concludes monitoring of the area.

Agency Outreach

By Bruce Greco, Director of Agency Outreach



The Agency Outreach Team had a very successful and productive field season this year, focused on data collection and analysis on several key U.S. Forest Service projects in the Southwestern Region. The team also participated in various roles with on-going Collaborative Forest Landscape Restoration Projects and provided science support to restoration implementation efforts. A few highlights include:

Upper Rocky Arroyo Restoration Project

Lakeside Ranger District, Apache-Sitgreaves NF: Completed a rapid assessment report on a 30,860-acre restoration project. This project is in the early stages of a NEPA analysis with a decision anticipated in 2015.

Pineleño Ecosystem Restoration Project

Safford Ranger District, Coronado NF: Assisted in the design and layout of a restoration demonstration area to be harvested in 2015 that features an interpretive

trail system through a mixed conifer ecosystem. The area has active Mt. Graham red squirrel middens and a unique management and fire history.

Tonto NF Forest Plan Revision

We provided an overview of ecological restoration concepts and a historical overview of forested ecosystems on the Tonto NF at recent public meetings held by the USFS. We also provide best-science information and references for consideration in the Plan revision.

Prescott NF MSO Habitat Treatment Study

Bradshaw Ranger District, Prescott NF: With the assistance of a great group of NAU-ERI student workers, we completed a rapid assessment to determine historical reference conditions in MSO PACs, focusing on treatment alternatives and the role of fire. The analysis will be summarized in an upcoming rapid assessment report.

White Mountain Stewardship 10-Year Final Report

Apache-Sitgreaves NF: ERI is assisting the ASNF and Sarah Hurteau, the project lead, in compiling the final report for the White Mountain Stewardship Project, which ended in August 2014.

For additional information on ERI's Outreach program, please contact Bruce Greco, Director of Outreach, (928) 523-4663 or bruce.greco@nau.edu or Mark Sensibaugh, Program Coordinator, Sr. at mark.sensibaugh@nau.edu.

Recent ERI Publications

FACT SHEETS

Abella, S.R. and J.D. Springer. 2014. [Effects of Tree Cutting and Fire on Understory Vegetation of Mixed Conifer Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 3 p.

Historically, fire occurred in dry mixed conifer forests every 2–20 years. Other mixed conifer forests, often on moister sites, likely burned less frequently but with greater severity. Review of the relevant literature, which is summarized in this fact sheet, suggests that fuel reduction or restoration treatments can reduce hazardous fuels and enhance native species in the short term and total understory abundance in the long term in dry mixed conifer forests.

Fulé, P.Z. 2014. [Unsupported Inferences of High-severity Fire in Historical Dry Forests of the Western United States: Response to Williams and Baker](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 3 p.

Forest ecologist Dr. Pete Fulé provides a summary of his, along with 17 other forest ecologists', response to Williams and Baker's (W&B) study in Global Ecology and Biogeography, where W&B used Government Land Office survey data to infer that forests historically had high densities of trees due to past fire regimes of moderate to high-severity fires.

Ha, W., S. Masek Lopez, and A. Springer. 2014. [Field Considerations for Measuring Evapotranspiration with the Eddy Covariance Method](#). Ecological Restoration Institute. ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 4 p.

Dr. Ha's fact sheet details the installation of an eddy covariance system—an atmospheric measurement technique that yields accurate evapotranspiration measurements—including flux tower placement requirement and maintenance of scientific instruments.

Ouzts, J.R., and T.E. Kolb. 2014. [Genetic Considerations for Restoring Forests of the Southwest After Severe Disturbance](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 4 p.

This fact sheet explains the need for using emerging knowledge about climate change and tree genetics to guide post-disturbance restoration of ponderosa pine in the Southwest. Climate change models show an increase in drying trends for the Southwest. As a result, locally adapted populations of ponderosa pine may become maladapted to current sites. Seedlings from more arid-adapted populations may promote forest recovery from disturbance during future warming and drying; however, more research about genetic variation in aridity adaptation of ponderosa pine is needed.

Roccaforte, J.P. 2014. [Planting to Restore Ponderosa Pine Sites Burned by High-Severity Fire](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 4 p.

This fact sheet outlines a restoration approach for tree planting after high-severity wildfire in southwestern

frequent-fire forests. Ecologist JP Roccaforte found that using historical reference conditions to guide replanting decisions is one way to promote resilient forests that function within their historical range of variability.

Rodman, K., and Sánchez Meador, A.J. 2014. [Characterizing Spatial Reference Conditions in Southwestern Warm/Dry Mixed-Conifer Forests](#). ERI Fact Sheets. Ecological Restoration Institute, Northern Arizona University. 3 p.

This fact sheet provides an overview of the existing research on spatial patterns in warm/dry mixed-conifer forests and provides recommendations for future research.

JOURNAL ARTICLES

Abella, S.R. and J.D. Springer. 2014. [Effects of tree cutting and fire on understory vegetation of mixed conifer forests](#). *Forest Ecology and Management*, <http://dx.doi.org/10.1016/j.foreco.2014.09.009>

Abella and Springer provide a review of the relevant literature on mixed conifer forests that suggests that fuel reduction or restoration treatments can reduce hazardous fuels and enhance native species in the short term and total understory abundance in the long term.

Ireland, K.B., M.M. Moore, P.Z. Fulé, T.J. Ziegler, R.E. Keane. 2014. [Slow lifelong growth predisposes *Populus tremuloides* trees to mortality](#). *Oecologia*, doi:

10.1007/s0042-014-2951-5.

With high mortality rates of aspen forests throughout much of the West, forest ecologists investigated the role of individual aspen tree's lifetime growth patterns and mortality through tree ring data to examine the relationship between lifetime growth patterns and mortality. Researchers found that slow growth at various stages of the tree's life is associated with increased mortality risk.

Tarancón, A.A., P.Z. Fulé, K.L. Shive, C.H. Sieg, A.J. Sánchez Meador, and B.A. Strom. 2014. [Simulating post-wildfire forest trajectories under alternative climate and management scenarios](#). *Ecological Applications*, 24(7), 1626–1637

In order to help forest managers better understand forest recovery processes after fire under future climate change and management actions, researchers modeled alternative climate and management scenarios in a severely burned forest of Arizona. The study showed sizeable differences in model outputs depending on climate and management actions, indicating that managers should incorporate climate change into analyzing environmental effects of alternative actions.

Waltz, A.E.M., M.T. Stoddard, E.L. Kalies, J.D. Springer, D.W. Huffman, and A.J. Sánchez Meador. 2014. [Effectiveness of fuel reduction treatments: Assessing metrics of forest resiliency and wildfire severity after the Wallow Fire, AZ](#). *Forest Ecology and Management*, 334 (2014) 43–52

This study examines whether fuel reduction treatments contribute to ecosystem resilience. Researchers studied forest conditions after the 2011 Arizona Wallow Fire and found that treatments simultaneously reduced fire severity and enhanced short-term metrics of ecosystem resiliency to uncharacteristically severe fire.

WORKING PAPERS

Gaylord, M.L. 2014. [Climate Change Impacts on Bark Beetle Outbreaks and the Impact of Outbreaks on Subsequent Fires](#). ERI Working Paper No. 31. Ecological Restoration Institute and Southwest Fire Science Consortium, Northern Arizona University. 7 p.

Monica Gaylord's review of relevant literature from across the West examines potential climate change impacts on bark beetle outbreaks and offers management recommendations to mitigate those impacts. It also examines the impacts of beetle-killed trees on future fires.

Kent, L.Y. 2014. [An Evaluation of Fire Regime Reconstruction Methods](#). ERI Working Paper No. 32. Ecological Restoration Institute and Southwest Fire Science Consortium, Northern Arizona University. 15 p.

Historical fire regimes are useful to inform current management practices. This working paper examines several methods for reconstructing historical fire regimes, including historical documents and photos, dendrochronology (both fire-scar data and tree age, death, and growth data), forest structure data, plant

traits, and charcoal. The advantages, disadvantages, inherent uncertainties, and assumptions as well as temporal and spatial precision are explored for each method.

WHITE PAPERS

Egan, D. and E. Nielsen. 2014. [The History of the Four Forest Restoration Initiative: 1980s–2010. ERI White Paper: Issues in Forest Restoration](#). Ecological Restoration Institute, Northern Arizona University: Flagstaff, AZ. 27 p.

This white paper is a comprehensive case history of the formative years of one of the first and largest collaborative landscape forest restoration projects in the country. It also includes an interactive visual [timeline](#) that chronicles the events leading up to the federal authorization of 4FRI and the Memorandum of Understanding signed by all four forest supervisors and 20 stakeholders in 2010.

GENERAL AND TECHNICAL REPORTS

Greco, B. and M. Sensibaugh. 2014. [Rapid Assessment Report: Upper Rocky Arroyo Restoration Project, Lakeside Ranger District, Apache-Sitgreaves National Forests](#). Ecological Restoration Institute, Northern Arizona University. 34 p.

The ERI Agency Outreach Team developed this Rapid Assessment Report on a 30,860-acre restoration project in the Lakeside Ranger District of the Apache-Sitgreaves National Forests. The forest invited ERI to collect historical ecological data for the project area to establish site-specific reference conditions. These reference conditions will be used by the interdisciplinary team as a point of reference for forest restoration project planning.



Partner Spotlight -- Salt River Project (SRP)

As one of the nation's largest public power utilities, SRP provides reliable electricity and water to more than 2 million people in Central Arizona. Most of the Valley's water supply comes from winter precipitation and runoff from Arizona mountains. In an effort to restore health and resiliency to our forests and to protect the state's watersheds, NAU/ERI and SRP researchers have partnered to study forest restoration and how restoration treatments affect water quality. This research will increase understanding of the relationship between forests, fire and water.

For more info on SRP's work to improve forest and watershed health, visit <http://www.srpnet.com/water/forest/default.aspx>.



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