



CONTENTS:

Overview of the
Effects of Burning on
Gambel Oak Produces
Management
Recommendations, p1

Graduating Seniors
Off to Exciting
Careers and
Adventures, p2

ERI Researchers
Study the Effects of
Lightning-ignited
Wildfires on the
Understory of Two
Fire-prone Forests in
Northern Arizona,
p2-3

ERI Kirk Smith
Scholarship, p3

ERI Plans Full
Summer Season of
Ecological Field
Research, p3-6

ARCS Scholarship
Winners, p6

ERI Field Guide
Heading Towards
Completion, p6-7

Alumni Corner, p7-9

Overview of the Effects of Burning on Gambel Oak Produces Management Recommendations by Dave Egan, ERI Sr. Editor



*Gambel oak foliage. Photo
by Judy Sedbrook*

Scott Abella and Pete Fulé recently published a research note for the U.S. Forest Service Rocky Mountain Research Station (www.fs.fed.us/rm/pubs/rmrs_rn034.html) that provides an overview of how Gambel oak (*Quercus gambelii*) responds to burning treatments and makes recommendation for its management in restoration situations. Comparing the results of two ERI experiments in northern Arizona where Gambel oaks populated the treated site, the two researchers found that oaks with a stem/trunk diameter greater than 6

inches had an average survival rate of 66 percent, while smaller oaks (2 inches in diameter or less) had only an 11-20 percent chance of surviving a surface fire. They also noted that Gambel oak, like most oaks, resprouts prolifically after fire, often producing brushy shrubfields that provide excellent wildlife habitat for small animal species.

Based on their survey, Abella and Fulé provide the following recommendations to land managers who are restoring ponderosa pine forests and want to protect or enhance the existing Gambel oak component of those ecosystems:

1. Reduce the fire intensity and duration around existing large oaks by a) keeping fire ignition points away from oaks, b) moving pine slash away from oaks, and c) raking thick litter away from the base of oak trees.
2. Maintain medium-size oaks (10-15 inches) because they are the trees most likely to produce acorns.
3. Recognize that other management techniques, especially thinning pine or other competing trees, produce greater gains in oak diameter growth than burning.

Prescribed burning with low-severity fire is unlikely to kill large oaks but will kill smaller-diameter trees and can produce extensive shrubfields. By manipulating the frequency of prescribed burns, land managers can create and maintain a variety of oak growth forms to achieve various management goals.





Graduating Seniors Off to Exciting Careers and Adventures by Kaitlin Tymrak




Graduation is a bitter-sweet time for the staff at ERI as we bid farewell to our undergraduates who have worked for us for several years. We are proud of their


many accomplishments and ready to watch them soar in whatever life has in store for them next. They will make excellent ambassadors for the ERI! Please join us in congratulating this semester's graduating class:


 **Gina Robinson**, Environmental Sciences, will be spending the summer surveying willow flycatcher nests on the lower Colorado River. Her new employer, SWCA Environmental Consultants, will no doubt be impressed with her hard work!


 Forestry major **Chris Sorensen** will be continuing his SCEP position with the National Park Service here in town, giving him a chance to enjoy Flagstaff without the stress of school.


 **Skyler Lofgren**, Parks and Recreation Management, currently has a full-time position with the Flagstaff Fire Department as a fire technician. In true Skyler style, he can be seen smiling and whistling as he works.

 Forestry major **Niki Steffen** will be heading back to her home town of Ketchikan, Alaska to work as a guide on a tour boat for the summer. Her dog Mosley is also excited about becoming an expert fish-catcher.

 Environmental Engineering major **Kaitlin Tymrak** is excited about starting her career in New Orleans. She will be working on the design portion of industrial site clean-up projects, putting her field note-taking skills learned at ERI to good use!

 **Megan Robertson**, Planning major, is interviewing for GIS positions in the public sector and hopes to remain in Flagstaff.

 **Austin Lyons**, Animal Behavior/Biology major, will be taking a much deserved break from school to travel before deciding on the next challenge she wants to tackle.

 And finally, **James Motichek**, Chemistry and Biology major, will be working for the ERI this summer as a seasonal employee. He then intends to travel as far as his wallet will take him, gaining inspiration for the next adventure in his life.

Congratulations to all of you fine students!

[ERI Researchers Study the Effects of Lightning-ignited Wildfires on the Understory of Two Fire-prone Forests in Northern Arizona](#)
by Dave Egan, Sr. Editor

ERI researchers, Daniel Laughlin and Dr. Pete Fulé, studied the responses of understory plants two years after lightning-caused wildfires burned geographically separate ponderosa pine-Gambel oak and spruce-fir-aspen forests on the North Rim of Grand Canyon National Park. In the ponderosa pine-Gambel oak forest on the Powell Plateau, where the wildfire burned primarily as a surface fire, they found that the number of species and the amount of plant cover both increased because grasses and annual and biennial forbs established in mineral soils where pine needle duff was reduced by the



ERI Researchers Study the Effects of Lightning-ignited Wildfires on the Understory of Two Fire-prone Forests in Northern Arizona (continued)

fire. This included seven of 15 indicator species of a recently burned ponderosa pine forest, and a 58-percent increase in cheatgrass (*Bromus tectorum*)—a highly invasive species that has been present on the plateau since the early 1940s.

In the spruce-fir-aspen forest at Little Park, the wildfire burned with a mix of surface and crown fire behavior, which resulted in the loss of coniferous trees and saplings and the creation of light-filled openings. This caused the loss of shade-tolerant understory plants and an increase in annual and biennial forbs and grasses in burned areas, but produced no net change in terms of species richness and cover.

Laughlin and Fulé note, however, that fire effects played a statistically weaker role in determining plant species richness and cover than environmental factors, such as topographic position and conifer density. For example, they found that species richness in the spruce-fir-aspen forest was typically greater on southern slopes than on northern slopes. Given the results of this field experiment, these researchers suggest that land managers anticipate increases in both native and non-native plant species following the use of wildland fires.

Laughlin and Fulé recently published their results in the *Canadian Journal of Forestry*. It can be found at:

<http://www.eri.nau.edu/joomla/files/NewsEvents/LaughlinFule.2008.WildlandFireEffects.pdf>.

2008 Kirk Smith Scholarship Winners Announced by Robin Long



Yolanda Becenti, Justy Leppert, Ryan Muehlhausen, and Doc Smith

Four ERI students-- Ian Hyp (not pictured), Yolanda Becenti, Ryan Muehlhausen, and Justy Leppert--were each awarded a \$500 Kirk Smith Scholarship at the annual Honors

Convocation April 18, 2008. In a moving tribute to the late Kirk Smith, son of Doc and Kathy Smith, members of the Smith family presented the scholarship and shared their memories of Kirk.

Now in its fourth year, the scholarship provides financial support for deserving students. To be selected, students must demonstrate their commitment to forest stewardship and write an essay about "doing the right thing," which is a trait Kirk Smith admired.

Donations to this and other ERI scholarships are tax deductible. For more information about scholarships, go to <http://www.eri.nau.edu/joomla/content/view/153/154/lang,en/>.

ERI Plans Full Summer Season of Ecological Field Research

by Judy Springer, Research Specialist, Sr.

As the end of the spring semester at Northern Arizona University approaches, staff and students of the ERI are busily preparing for the 2008 field season. This year, they will be conducting research throughout the national forests of Arizona; at Grand Canyon National Park (GCNP), Grand Canyon-Parashant National Monument, Centennial Forest (state land west of Flagstaff); and as far south as the



ERI Plans Full Summer Season of Ecological Field Research (continued)

Sierra Madre Occidental and Sierra Madre Oriental ranges in Mexico. Planned projects include the following:

Centennial Forest botany (Judy Springer, principal investigator): This study is part of the ERI's Long-term Ecological Assessment and Restoration Network (LEARN). One hundred sixty monitoring plots were installed in 2001. These plots have been thinned of excess small-diameter trees but have not received a prescribed burning treatment. We plan to collect herbaceous plant data on all plots to monitor plant community response following the thinning treatments.

Grand Canyon experimental blocks (Mike Stoddard and Pete Fulé, principal investigators): As another part of the LEARN, the ERI installed plots in experimental blocks at three sites in 1997. One block is located in Grand Canyon National Park at Swamp Ridge on the North Rim (this unit in mixed conifer received minimal thinning because GCNP imposed diameter caps of 5 inches), one is located near Grandview Point on the South Rim (this unit is also within GCNP and is an oak-pine ecosystem), and the third is also located near Grandview, but just outside the park boundary in the Kaibab National Forest. This year's measurements will determine the effects of ecological restoration on forest structure, fuels, tree regeneration, and plant communities five and nine years after treatment on the national park and national forest lands, respectively.

Northwest III Fire (GCNP) (Daniel Laughlin and Pete Fulé, principal investigators): Northwest III Fire is the name of a forest unit on the North Rim of GCNP that was burned in 1993 by a prescribed

fire that escaped prescription. In 1999, ERI staff established monitoring plots within the burn perimeter and on a nearby control unit. National Park Service personnel re-burned the NWIII in 2007. We will be collecting data this summer to examine the effects of two prescribed fires on forest structure, seedling recruitment, and fuel loads.

Pinyon-juniper fire history (Dave Huffman, principal investigator): In order to gain a better understanding of reference conditions for pinyon-juniper ecosystems, we will be conducting a fire history study on Anderson Mesa, about 20 miles southeast of Flagstaff. We will use multiple lines of evidence, including stand structure and age, charred tree locations and fire scar analysis, to reconstruct historical fire regime parameters, such as fire frequency, type, and spatial extent. This work will provide information to support management activities on an important local landscape.

Post-wildfire fuels (John Paul Roccaforte and Pete Fulé, principal investigators): This study will examine a chronosequence of six to eight fires in ponderosa pine forests. The timing of these fires ranges from only a few years to about 20 years ago. We will be collecting quantitative data to examine effects of salvage logging, or the absence of it, on burned sites in the Tonto (Dude Fire), Prescott (Indian Fire), Apache-Sitgreaves, and Coronado national forests.

Rapid assessments (Matt Tuten, principal investigator): This work involves two separate studies, one near Williams and the other on the Coronado National Forest in southeastern Arizona. In 2005, monitoring plots were installed within a demonstration area near Williams to compare how goshawk guidelines thinning treatments and evidence-based ecological restoration thinning treatments affected forest structure. The units have since been thinned.



ERI Plans Full Summer Season of Ecological Field Research (continued)

We will assess forest structure on these plots, and if time allows, will also re-map trees and compare the current structure to that on the pre-treatment plots.

The study on the Coronado National Forest involves two areas that were set aside to demonstrate restoration in dry and wet mixed conifer forests. We will apply an ecological restoration prescription using the presettlement evidence-base model and then measure the forest structure following thinning to determine whether this particular treatment method can be used in these Pinaleños Mountains ecosystems.

Tusayan fuels management (Dave Huffman, principal investigator): In 2004, we established an experiment near Tusayan, Arizona, close to the South Rim of GCNP. We designed the experiment, which is part of the LEARN, to test treatment alternatives for reducing fuel hazards in pinyon-juniper woodlands. In the experiment, replicated units received either thinning, prescribed fire, a combination of thinning and fire, or no treatment. By 2006, we collected measurements of overstory structure and understory community characteristics. Two efforts will be undertaken at the Tusayan site during the 2008 field season:

- © **Tusayan botany** (Mike Stoddard, principal investigator): This effort will measure understory changes (understory species composition and cover) associated with the Tusayan Fuels Management experiment.
- © **Tusayan pollinator study** (Susan Nyoka, principal investigator): We will be conducting a study of the main pollinating insect taxa at the Tusayan pinyon-juniper field site. We will examine how pollinator community patterns are related to fuels


reduction treatments. We will also test for correlations between pollinator occurrence and habitat variables such as downed wood, bare soil, and flower resources.

The following graduate students will also be conducting research during the upcoming field season:


- 🌻 **Citlali Cortes** (Ph.D., advised by Pete Fulé): The forest dynamics of old-growth pine-oak ecosystems in Chihuahua, Mexico.
- 🌻 **Corinne Diggins** (M.S., advised by Pete Fulé): Modeling forest change, bird communities and management alternatives on a restored ponderosa pine ecosystem.
- 🌻 **Katie Ireland** (Ph.D., advised by Pete Fulé): Climate, fire, and forest structure interactions in northern Arizona.
- 🌻 **Liz Kalies** (Ph.D., advised by Wally Covington and Carol Chambers): Small mammal responses to forest management practices in southwestern ponderosa pine forests at the species, community, and food web scale.
- 🌻 **Valerie Kurth** (Ph.D., advised by Steve Hart and Pete Fulé): Long-term carbon storage and fire management in ponderosa pine forests.
- 🌻 **Daniel Laughlin** (Ph.D., advised by Margaret Moore): Functional consequences of long-term vegetation changes in pine-bunchgrass ecosystems.
- 🌻 **Ken Stella** (M.S., advised by Pete Fulé and Carolyn Sieg): Plant community responses to seeding treatments in post-wildfire landscapes in northern Arizona ponderosa pine forests.




ERI Plans Full Summer Season of Ecological Field Research (continued)

 **Larissa Yocom** (Ph.D., advised by Pete Fulé):
Fire and climate interactions in northern Mexico.

Finally, two ERI undergraduate research assistants will be conducting the following studies:

 **Isaac Bickford** will be measuring how trees of the same species respond to drought across an elevational gradient.

 **Christen Irby** will be developing a new tree-ring chronology from which he hopes to reconstruct climatic patterns.

ARCS Scholarship Winners by Krista Coquia



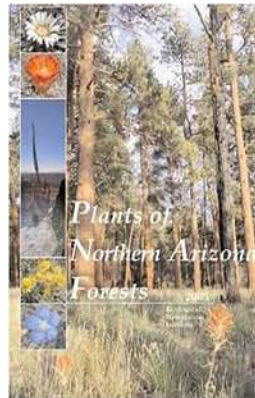
*Liz Kalies, Daniel Laughlin,
and Valerie Kurth*

Congratulations to doctoral students Valerie Kurth, Daniel Laughlin, and Elizabeth Kalies for receiving Achievement Rewards for College Scientists scholarships of \$7,000 each for the 2008-09 academic year. The funding will be used for completing fieldwork, lab work, updating equipment, purchasing reference material and traveling to scientific symposiums.

Liz Kalies doctoral work focuses on how small mammals respond to different forest management practices, including restoration and fuels reduction treatments, in ponderosa pine forests of the Southwest. Valerie Kurth's research focuses on fire effects on ecosystem nutrient cycling (nitrogen and carbon). Daniel Laughlin is working in the Grand Canyon with ecosystem restoration and management.

Founded in 1958, the ARCS Foundation is composed of volunteer professional and nonprofessional members who award scholarship funding to academically outstanding U.S. citizens studying to complete their degrees in science, medicine and engineering, thereby contributing to the worldwide advancement of science and technology.

ERI Field Guide Heading Towards Completion by Mark Daniels, ERI Research Specialist



Since 2000, a number of ERI staff, seasonal employees, and students have been writing and revising a botanical field guide to northern Arizona forests. The book was originally intended as an identification aid and training tool for ERI botanists, covering the most commonly encountered species at our study sites.

However, it quickly became apparent that, if we broadened the scope a bit, the guide could serve a much wider audience of northern Arizona professional and amateur botanists, land managers, and interested laypeople. We began thinking about publication at this point because existing botanical resources for the region were outdated and/or incomplete, and typically difficult to use for non-professionals. An expanded version of the guide had the potential to fill a large gap in the regional botanical literature.

The book was expanded and revised each year through 2005, and grew to offer comprehensive coverage of all plant species found in ponderosa pine forests up through mixed-conifer, spruce-fir, and alpine ecosystems from the Mogollon Rim north to



ERI Field Guide Heading Towards Completion (continued)

the Utah border. The 2005 draft version is the most complete and professionally laid-out effort to date, and has been widely circulated among local botanists and students in several NAU classes.

In 2006, with the assistance of ERI seasonal botanist, Mare Nazaire, and others, we began a major revision of the text from cover to cover to reflect recent species name changes, ensure comprehensive coverage of the region, and impose a consistent style on the text and species descriptions. In late 2007, the ERI prioritized completion of the field guide for the 2008 fiscal year, and made funding available to hire Mare through the summer of 2008 to work exclusively on completing the revised text.

At present, Mare is about three-quarters of the way through editing and updating the species and family descriptions. She has also written numerous new diagnostic keys to assist users in the correct determination of species. ERI staff members, meanwhile, are tracking down illustrations and photos for the guide, and updating the notes sections of the species descriptions. By the end of March, 2009, we plan to have a completed draft ready for publication. It's been a long road, but the ERI field guide is finally nearing completion!



Asters, Pussytoes and Pinecones.
Photo David Egan.

Alumni Corner by Kaitlin Tymrak

- Let's start with the news from several recent graduates who have checked in...



Aleta Rudeen (B.A. International Affairs '06) loves Fort Collins and is excited about her next academic challenge at Colorado State University. She is now working towards her master's degree in

Rangeland Ecosystem Science, focusing her research on collaboration, conflict management, and communication. Her undergraduate research project at the ERI no doubt prepared her to take on these important issues!

Clara Pregitzer (B.S. Forestry '07) is keeping busy learning about the trees and plants of Tennessee. While working towards her master's degree in Ecology and Evolutionary Biology at the University of Tennessee, she is also teaching two biology labs. This summer Clara will return to her field sites in Utah and Arizona, continuing her study of cottonwood trees.



It's no surprise that **Chance Peterson** (B.S. Ed. Physics '06) can be found teaching English in northeast Korea. He reports that Korea is an impressive



Alumni Corner (continued)

country with friendly people, good food, and beautiful places to visit. In addition to teaching, he is also taking online classes for a master's degree in Education in Teaching English. Although his badminton and ping-pong skills are improving, he still tunes into the Phoenix Sun's basketball games whenever he can!

- It's only April, but so far 2008 has seen a bumper crop of babies!



January saw the arrival of two healthy boys.

Steven Martin (B.S. Biology '04) and his wife, Elizabeth, are excited about their second son, Jacob.

Aaron Green (B.S. Forestry '02) is also a proud father with the addition of Sawyer. Both families report to be happy and healthy!



Also adjusting to less sleep is **Rita Dodge** (M.S. Forestry '04), who is happy to announce the birth of her second son, Bodie, in February. Maternity leave will surely go by

fast before Rita returns to her job as a conservation director at Red Butte Garden in Salt Lake City.



In March, **Aaron Wilkerson** (B.S. Forestry '03), became a dad for the third time with the arrival of Abigail. Congratulations, Aaron and Ericka!

Just weeks ago, **Lauren Labate** (M.Ed. Education '02) had a baby boy. He was 7 lb 12 oz and 21 inches long. His name is Drew Edward Davison. Whew! That's a lot of new babies!



- Finally, it's good to hear from these ladies:

Heather Reading (M.S. Forestry '01, B.S. Biology '99) is enjoying her job with The Nature Conservancy in Prescott, Arizona. She is proud to announce the successful purchase by TNC of a nature preserve on the Verde River, a project she has been working on since she started there. The Verde River Springs Preserve protects the river at its very source. Her job with TNC has given Heather a wonderful chance to return to the Chino Valley area where she grew up and spent many happy days riding horses, bikes, and exploring the outdoors. Congratulations, Heather!



Alumni Corner (continued)



Kudos are also in order for **Jenna McKnight** (B.S. Environmental Journalism '00). Jenna received her master's degree in Arts Journalism from Syracuse University,

and is currently living in New York City. She works as a web editor for two McGraw-Hill magazines, and they both recently won "Best Web Site" Neal Awards. Very impressive!

Julie Korb (Ph.D. Forest Science '01) sent news that she received tenure and a promotion to associate professor at Fort Lewis College in Durango, Colorado. Her current research projects include:



1) warm-dry mixed conifer restoration study in the San Juan Mountains, Colorado, quantifying the effects of thinning and prescribed burning on plant community dynamics; and 2) vegetation responses to different burn intensities and restoration treatments in the Missionary Ridge Burn Area, San Juan Mountains. Congratulations, Julie!

Have alumni news to share? Please send your news to Robin Long at robin.long@nau.edu or call (928) 523-7187.

Ecological Restoration Institute

Northern Arizona University
PO Box 15018, Flagstaff, AZ 86011

The ERI is a pioneer in conducting research and disseminating information about restoration treatment outcomes, strategies, and techniques in the Southwest. We seek to provide the best available knowledge about restoration to a wide variety of audiences, from academic researchers to professional land managers to members of the public. Our work focuses on both ecological and sociopolitical issues.