

# ARIZONA HIGHWAYS

JUNE 2015 VOL. 91, NO. 6

800-543-5432  
www.arizonahighways.com

**PUBLISHER** Win Holden  
**EDITOR** Robert Stieve  
**ASSOCIATE PUBLISHER,  
DIRECTOR OF SALES & MARKETING** Kelly Mero  
**MANAGING EDITOR** Kelly Vaughn  
**ASSOCIATE EDITOR** Noah Austin  
**EDITORIAL ADMINISTRATOR** Nikki Kimbel  
**PHOTOGRAPHY EDITOR** Jeff Kida  
**CREATIVE DIRECTOR** Barbara Glynn Denney  
**ART DIRECTOR** Keith Whitney  
**DESIGN PRODUCTION ASSISTANT** Diana Benzal-Rice  
**MAP DESIGNER** Kevin Kibsey  
**PRODUCTION DIRECTOR** Michael Bianchi  
**WEBMASTER** Victoria J. Snow  
**CIRCULATION DIRECTOR** Nicole Bowman  
**FINANCE DIRECTOR** Bob Allen  
**OPERATIONS/IT MANAGER** Cindy Bormanis

**CORPORATE OR TRADE SALES** 602-712-2019  
**SPONSORSHIP SALES  
REPRESENTATION** On Media Publications  
Lesley Bennett  
602-445-7160

**LETTERS TO THE EDITOR** editor@arizonahighways.com  
2039 W. Lewis Avenue  
Phoenix, AZ 85009

**GOVERNOR** Douglas A. Ducey  
**DIRECTOR, DEPARTMENT  
OF TRANSPORTATION** John S. Halikowski  
**ARIZONA TRANSPORTATION  
BOARD CHAIRMAN** Kelly O. Anderson  
**VICE CHAIRMAN** Joseph E. La Rue  
**MEMBERS** Stephen W. Christy  
William Cuthbertson  
Deanna Beaver  
Jack W. Sellers

Arizona Highways® (ISSN 0004-1521) is published monthly by the Arizona Department of Transportation. Subscription price: \$24 a year in the U.S., \$44 outside the U.S. Single copy: \$4.99 U.S. Call 800-543-5432. Subscription correspondence and change of address information: Arizona Highways, P.O. Box 8521, Big Sandy, TX 75755-8521. Periodical postage paid at Phoenix, AZ, and at additional mailing office. CANADA POST INTERNATIONAL PUBLICATIONS MAIL PRODUCT (CANADIAN DISTRIBUTION) SALES AGREEMENT NO. 41220511. SEND RETURNS TO QUAD/ GRAPHICS, P.O. BOX 875, WINDSOR, ON N9A 6P2. POSTMASTER: Send address changes to Arizona Highways, P.O. Box 8521, Big Sandy, TX 75755-8521. Copyright © 2015 by the Arizona Department of Transportation. Reproduction in whole or in part without permission is prohibited. The magazine does not accept and is not responsible for unsolicited materials.



PRODUCED IN THE USA

## MOLLY BILKER

Molly Bilker, our editorial intern for the fall 2014 semester, authored many of the nature stories you'll see in *The Journal* (see page 5) over the next several months. And she authored them quickly, which isn't typical at a monthly magazine. "Most of the time in journalism, with the deadlines and the interview pressure, I feel like I'm in complete peril," she says. "The lack of intense pressure I felt at *Arizona Highways* was unexpected and refreshing. I was able to work at the best pace for me." Bilker plans to graduate from Arizona State University in May 2016 with two degrees: a bachelor's in journalism and a master's in mass communication. But her passion is creative writing, on which she hopes to focus in graduate school. "I'd say my internship at *Arizona Highways* has been the highlight of my journalism experiences since I came to ASU," Bilker says.



JEFF KIDA



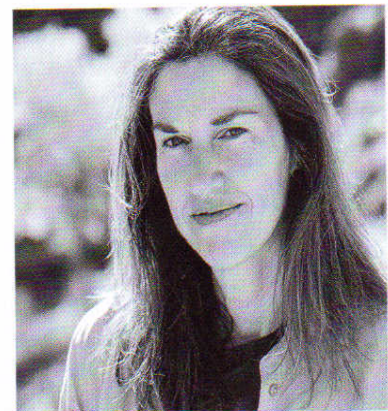
## MARK LIPCZYNSKI

Photographer Mark Lipczynski has a difficult name to spell. That's our challenge on a regular basis. His challenge for this month's issue was photographing sculptor Rusty Bowers (see *Breaking the Mold*, page 50), who's contributing to a Phoenix memorial to Arizona's fallen firefighters and first responders. "The environment at Bowers' forge is very cluttered and busy," Lipczynski says. "I struggled to get a 'clean' shot of him working on the life-size figures, but every angle had clutter in it, so I had to reshoot the photos

at Bowers' house in the Usery Pass area east of Phoenix." Despite the difficulty, Lipczynski says he enjoyed the shoot: "Having grown up in the Steel Belt in Ohio, I like industrial stuff. So I was interested in the process of going from a concept to a completed bronze sculpture." Lipczynski's recent work includes shoots for Major League Baseball, *Dwell* and *Marie Claire*. He also showed two Japanese photographers around Arizona via an exchange program with the nonprofit group Through Each Others Eyes.

## ANNETTE MCGIVNEY


The San Francisco Peaks drew writer Annette McGivney to Flagstaff two decades ago, which made the destruction wrought by the 2010 Schultz Fire (see *Sifting Through the Ashes*, page 42) hard to watch. "With this story," she says, "I knew enough time had passed that ecological recovery had begun. I wanted not only to witness the recovery by hiking into the burned places, but to understand the processes that were in play." As McGivney tagged along with scientists on the front lines of studying and supporting the peaks' recovery from the fire, she says she had to be constantly mindful of burned trees that might be blown over by a strong wind. "The U.S. Forest Service required me to wear a hard hat when I was out with the scientists, but that would do little to cushion the blow of a falling tree," she says. McGivney is the Southwest editor for *Backpacker* magazine, and she contributed to *Desert Water*, a University of Utah Press book published in 2014.



JOHN BURCHAM

—NOAH AUSTIN





# SIFTING THROUGH THE ASHES

Five years ago this month, an abandoned campfire in one of Arizona's most popular recreation areas exploded into a fast-moving inferno known as the Schultz Fire. Although it consumed more than 15,000 acres and completely scorched the forest in places, scientists are learning a lot from the blaze. Even more importantly, the burn areas are showing signs of life.

BY ANNETTE MCGIVNEY  
PHOTOGRAPHS BY JOHN BURCHAM

**F**IRST THERE WAS THE FIRE. Then there was the flood. Even in Arizona, a state that has experienced more than its share of devastating fires and floods, this was a natural disaster of almost biblical proportions.

On June 20, 2010, the embers from an abandoned campfire in Northern Arizona's Coconino National Forest took flight and ignited surrounding brush. When the first fire crew arrived at the location near Schultz Tank north of Flagstaff, the blaze encompassed 2 acres. But 50 mph wind gusts soon overpowered the crew, and the fire jumped the road, caught the crowns of trees and exploded into a fast-moving inferno as it barreled across the San Francisco Peaks' steep eastern flank. By nightfall, the Schultz Fire had grown to approximately 8,000 acres. And by the time the blaze was fully contained 10 days later, it had consumed more than 15,000 acres of national forest in the heart of one of Arizona's most popular recreation areas.

But the fire wasn't the worst of it. On July 20, an epic monsoon storm dumped 1.78 inches of rain on the peaks in 45 minutes. Nearly 1 inch fell in 10 minutes. The vegetation and topsoil on the mountain normally act like a sponge that soaks up rain, but the unnaturally hot fire had cooked the surface and turned once-luscious meadows and forests into a water-repellent parking lot. Some 30 million gallons of water, along with a torrent of ash, debris and boulders as big as Volkswagens, rolled off the peaks and into residential areas below. The flash flood engulfed homes that had been evacuated during the fire just weeks before, and, most tragically, a 12-year-old girl walking along a normally dry drainage in the forest was swept away and drowned.

"The whole mountainside came apart," says Dan Neary, a research hydrologist and soil scientist with the U.S. Forest Service's Rocky Mountain Research Station. "It was a monumental erosion event that had not occurred on that scale in 1,000 years." Neary estimates

---

A lupine sprouts in front of a tree charred by the Schultz Fire, which burned more than 15,000 acres near Flagstaff in 2010.



Forest Service contractors and volunteers have individually planted approximately 100,000 ponderosa-pine seedlings in the devastation zone. The effort began immediately after the fire.

the last time the San Francisco Peaks were reshaped on the level of what happened during the summer of 2010 was before nearby Sunset Crater Volcano erupted in the 11th century.

On the first day of the Schultz Fire, I stood in my front yard in downtown Flagstaff and watched in disbelief as an orange-and-black mushroom cloud billowed hundreds of feet into the sky. In the next few years after the disaster, when I drove U.S. Route 89 past the peaks, I could barely stand to look at the gaping wound on the east side of the mountain. No matter the season, the slopes were always brown. And I didn't have the heart to hike there and witness the devastation up close.

But I could stay away for only so long. By the summer of 2014, as I drove on the highway and studied the peaks from a mile away, I glimpsed tiny patches of green amid the brown. I thought of one of my favorite quotes from Helen Keller: "Although the world is full of suffering, it is also full of the overcoming of it." *Could there possibly be something good, I wondered, arising out of something so terrible?* I would have to get much closer to the suffering to find out.

**T**HE LITTLE BEAR TRAIL, on the northeast side of Mount Elden, is about a mile from the Schultz Fire's ignition point. Soon after the blaze started, the fire charged through the wind tunnel of Schultz Pass and came down hard here, devouring nearly 100 percent of the vegetation around the upper reaches of the trail and along nearby Schultz Pass Road (Forest Road 420).

"On the first day, the fire cooked the mountain," says Andy Stevenson, a silviculturist with the Coconino National Forest's Flagstaff Ranger District who has been heading up landscape-restoration efforts after the fire. "The heat was so intense, it cracked rocks."

Much of what burned that day was an unnaturally hot "high intensity" inferno that destroyed everything in its path and, in the words of Stevenson, left a "totally denuded, 4,000-acre hole" in the forest.

Under a cloudless sky one morning in August 2014, I am following Stevenson into the hole. We are hiking the Little Bear Trail and donning hard hats to guard (at least a little) from falling trees. Before we get to the burn area, Stevenson points out what he considers the signs of an unhealthy forest that contributed to the highly destructive nature of the Schultz Fire. The trees are spindly and closely spaced, and the forest floor is filled with dead and downed trees — like a rag soaked in gasoline, waiting for a flame.

As we make our way up the trail, we repeatedly scramble

around deep gullies that were carved by flash floods in July and August 2010. In one place, a narrow gash cuts down 4 feet and is filled with microwave-size boulders that tumbled down the mountain. Higher up on the peaks, where the slopes are nearly straight up in some places, the erosion is even worse. In these severely burned areas, the topsoil has completely washed away and gullies slice deep into the mountain, eroding all the way to bedrock.

In the years after the fire, volunteer trail crews worked diligently to restore the Weatherford, Little Elden and Little Bear trails, which had been washed out and littered with charred, fallen trees. "This used to be a giant boulder field until the volunteers moved the rocks," Stevenson says as we walk over a newly constructed drainage crossing. (While all the trails were reopened, a 2013 monsoon event washed out the Little Bear Trail, which now is closed again until funding to restore it is secured.)

Climbing up a hillside, we are surrounded by black snags that look like telephone poles, but the ground is profusely green, filled with invasive weeds, native grasses and the occasional wildflower. Stevenson explains that the heat from a fire — even an unnaturally intense one — releases nutrients from the soil, which jump-starts the revegetation process. "The grasses are coming back here more than I've seen in the past," he says. "Right after the fire, pronghorns even came into this area from Sunset Crater to graze, which I have never seen before."

However, Stevenson points out that the fire hit ponderosa pines especially hard. The slow-growing conifers are designed to tolerate moderate-intensity fires that move through the forest floor without disturbing the forest crown. Ponderosas were decimated in the 4,000-acre, high-severity hole left by the Schultz Fire, so Stevenson is carrying out an ambitious replanting program. Forest Service contractors and volunteers have individually planted approximately 100,000 ponderosa-pine seedlings in the devastation zone. The effort began immediately after the fire, with Forest Service staff growing trees in greenhouses from seeds collected years before the blaze. It takes a full year of tending in just-right conditions to coax the seedlings to the stage where they're ready for planting. And once they're in the ground, there are other challenges.

After our hike, Stevenson and I check on some of the ponderosas planted in 2013. Each seedling is covered with a 2-foot-tall plastic cone intended to give the baby pines a fighting chance against elk, which are enjoying the bounty of greenery after the fire.

"Oh, man! Here's a dead one!" says Stevenson as he pulls up a cone to find a tiny, brown tree. He blames this death on gophers eating the seedling's roots from underneath. Accord-

A damaged tree trunk frames ponderosa pines in the Schultz Fire burn area. The burned trees, at risk of falling in heavy wind, can be dangerous to those aiding the area's recovery.





BELOW: Students from Flagstaff's Ponderosa High School help restore the Schultz Fire burn area using ponderosa-pine seedlings grown in the school's nursery.



ABOVE: Wildflowers and other vegetation contrast with scorched ponderosas on a misty morning in the burn area.



ing to Stevenson, about half the ponderosa seedlings planted after the fire have died, mostly from gophers, elk or lack of moisture.

"We've got a live one!" he says with a smile as he pulls up another cone to reveal a 1-foot-tall ponderosa that is making a go of it amid a dense field of mullein, an exotic weed species that has overtaken the area. "This one has really sprouted up."

Nearby is a cone that has been fortified with a circle of rocks, and inside we discover another healthy pine. Stevenson notes that the trees planted by volunteers have a greater survival rate than those planted by Forest Service contractors. "The volunteers put more into it," he says.

**UNLIKE PONDEROSA PINES**, aspens are designed to survive — even thrive — after high-severity crown fires through their ability to regenerate quickly through root suckering. Along Waterline Road (Forest Road 146) on the upper slopes of the peaks, where mixed-conifer forests were devoured by fire and topsoil was swept away by flooding, about the only things growing four years after the burn are aspens. Even in higher elevations that experienced moderate fire damage, the level of aspen regeneration is surprising Forest Service scientists.

"Individual aspens are relatively short-lived and die so they can regenerate through the same root system," explains Mary

Lou Fairweather, a Forest Service plant pathologist who is based in Flagstaff and has been studying aspen mortality in Arizona for more than two decades. Since 2003, Fairweather has gathered data annually from more than 50 plots established in aspen stands on the San Francisco Peaks. She originally started monitoring the plots to study the effects of drought and try to determine why aspens were in precipitous decline on the mountain. But after the Schultz Fire burned through 14 of 18 plots in a stand there, she also began monitoring the aspens' response to the blaze.

"I was excited about the fire because I knew I would get all this new data," says Fairweather. It is October 2014, and I am hiking with Fairweather up a steep, aspen-covered slope toward her plots. The study area occupies 40 acres above and below Waterline Road, east of Schultz Peak. It is located in a mixed-severity region of the Schultz Fire, which left parts of the forest disturbed but not burned completely. We scramble over downed aspens and through pockets of coal-black snags. Fairweather holds her GPS device in front of her to home in on plot-location coordinates.

"Here we are!" she says as we arrive at a 6-inch-tall stake in

the ground that is marked with pink flagging tape. Each regeneration plot is a hundredth of an acre, and every fall she measures the height and health of every aspen seedling and sapling in that area to gauge change from one year to the next.

Before the Schultz Fire, Fairweather's data showed a pattern of steady decline. There was little new growth on her plots, and 90 percent of the saplings were not getting taller than 1 foot. None was taller than 3 feet. In 2009, she counted an average of 1,361 trees per acre. After the fire, in 2011 and 2012, that number grew to 10,000 trees per acre. This explosion is the aspens' normal response to fire. Even if the tree is burned to the ground, its root system produces profuse suckers during the two years after the blaze.

Fairweather expected the sucker growth, but what surprised her was the high number of aspen seedlings that began sprouting up. Born from copious amounts of seed dropped after the fire, these new trees will establish their own root systems, and Fairweather believes they could be critical to saving aspens on the peaks because they increase genetic diversity and forest health. That is, if the seedlings and saplings are not eaten first.



The abundant aspen growth has provided an all-you-can-eat buffet for elk. Fairweather's data documents heavy — sometimes devastating — browsing in her plots. "I haven't found one yet that isn't browsed on this plot," she says as she measures a stem that is about 1 foot tall and has been stripped of its leaves.

Arizona Game and Fish Department managers have responded to the elk's increased browsing of aspens since the fire by increasing hunting pressure in high-elevation areas. They established a new sub-unit in 2011 within the larger Unit 7 East hunting area. Over the last four years, elk permits issued in the sub-unit have been increased, from 200 in 2011 to 585 in 2014 and 2015, as a way to reduce the population and minimize aspen browsing.

While Fairweather still views elk as one of the biggest threats to aspen health, she has seen the browsing in her plots decrease slightly since the new hunting regulations were put in place, from 77 percent of all trees munched in 2013 to 62 percent in 2014. But even more promising is that some saplings are growing taller than what she observed before the fire. In areas of the burn that are not inviting to elk — on very steep slopes, amid barriers of fallen trees or along Waterline Road — aspen saplings are 7 feet tall and thriving.

"These are so adorable," says Fairweather. "I've never seen seedlings in such abundance here until after the fire." We have trudged up to the highest plot and the last one she will measure for the season. A handful of baby aspens with tiny green leaves are pushing through black soil. Nearby, a mature aspen stand untouched by fire is in full autumn splendor. We sit on a carpet of fallen leaves to catch our breath as a gentle wind unleashes a shower of shimmering gold discs that swirl all around us.

**W**HILE STEVENSON WISHES the Schultz Fire never happened, he says Forest Service scientists are learning a great deal from post-fire recovery efforts. They're also learning that the disaster served as an important wake-up call for the citizens of Flagstaff. In November 2012, Flagstaff voters overwhelmingly approved a \$10 million bond to support the Flagstaff Watershed Protection Project. It is one of the first municipally funded forest-restoration efforts in the country, and it will facilitate thinning and controlled burns on more than 10,000 acres of Coconino National Forest land around Flagstaff to prevent another Schultz Fire kind of disaster.

Although it may be a century before the worst part of the Schultz burn area returns to the scenic ponderosa-pine forest that it once was, there is a phoenix rising from the ashes in the form of volunteers who are on a mission to help heal the land.

Although it may be a century before the worst part of the Schultz burn area returns to the scenic ponderosa-pine forest that it once was, there is a phoenix rising from the ashes in the form of volunteers who are on a mission to help heal the land.



Among the most dedicated of this group are the students at Ponderosa High School, a Flagstaff accommodation school that serves at-risk teens and others who benefit from a non-traditional learning environment.

On October 2, 2014, I join the students for their Service Learning Day project: planting 100 ponderosa seedlings in the scorched earth around Schultz Pass Road. After receiving instruction from Stevenson on how to plant the seedlings, the students don hard hats and carry shovels and cartons of seedlings into a field of jagged black snags and green mullein stalks.

"These seedlings will survive. We've taken good care of them," says a student named Feather as she swings a pick to

A 2-foot-tall plastic cone protects a newly planted ponderosa-pine seedling from elk, which have slowed Schultz Fire recovery efforts by eating new growth.

remove a rock and make room for the new plant. She gently sets the seedling in the ground and pats dirt around it.

"We take pride in what we do," adds another student, Isaac, who is relishing the sense of accomplishment that this project brings.

Since 2011, Ponderosa High students have tended seeds collected from the burn area in the school's nursery. They have watered and nurtured the plants with compost from food waste collected from area restaurants. This latest planting is

the fifth such event the students have carried out as part of the Forest Service's long-term recovery efforts. Stevenson hopes to plant ponderosa seedlings on an additional 1,000 acres in 2015 with the help of Ponderosa High students and other volunteers.

Down the road from Feather and Isaac, a student named Alex is putting great effort into digging the perfect hole. He wants to make sure the seedlings have a good home. Alex says after graduating from high school, he plans to become a personal trainer and open his own gym. But right now, he is finding joy and purpose in bringing life to the ailing forest.

"It took us over a year to grow these," he says of the seedlings at his feet. "It feels good to finally get them in the ground." **AH**