WINTER 2015
$2.95

National Parks

THE MAGAZINE OF THE NATIONAL PARKS CONSERVATION ASSOCIATION

CAVES IN THE CLOUDS

Exploring Mount Rainier's Ice Caves

A GOODBYE IN YELLOWSTONE

TREKKING ACROSS CRATERS

BURNING BATTLEFIELDS

Flo doesn't personally cover your RV, but we do.

Progressive is America's #1 specialty RV insurance provider.
From motor homes to camper vans and travel trailers, we've got you covered.

PROGRESSIVE®

1.800.PROGRESSIVE / PROGRESSIVE.COM

Progressive Casualty Ins. Co. & affiliates. Insurance prices and products are different when purchased directly from Progressive or through independent agents/brokers.
No. 1 in specialty RV insurance from 2013 Millward Brown national survey data.

National Parks

WINTER 2015 / Vol. 89 No. 1

24

LINING UP for a 3 a.m. ascent of Mount Rainier.

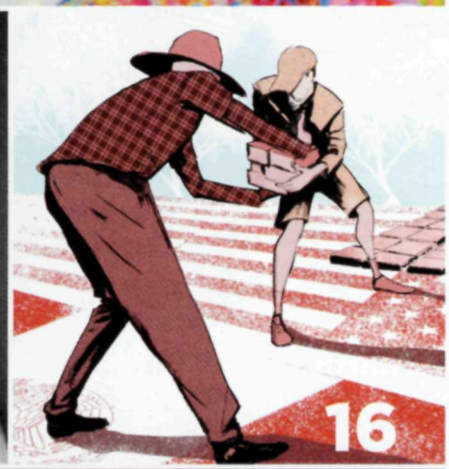
© FRANÇOIS-XAVIER DE RUYDTS

CONTENTS

FEATURES

COVER IMAGE:
A HIKER PAUSES on Disappointment Cleaver after a night-long snowstorm on Mount Rainier.
© FRANÇOIS-XAVIER DE RUYDTS

National Parks (ISSN0276-8186) is published quarterly (January, April, July, & October) by the National Parks Conservation Association, 777 6th Street NW, Suite 700, Washington, DC 20001-3723. Single copies are $2.95. Printed in the United States. Periodicals postage paid at Washington, DC, and additional mailing offices. Articles are published for educational purposes and do not necessarily reflect the views of this association. POSTMASTER: Send address changes and circulation inquiries to: National Parks, Member Services, 777 6th Street NW, Suite 700, Washington, DC 20001-3723.



CLOCKWISE FROM TOP: RYAN CURRAN WHITE/PARKS CONSERVANCY; © AARON McCONOMY/COLAGENE.COM; © ANDREW RECHER; COURTESY OF THE STATE ARCHIVES OF FLORIDA

DEPARTMENTS

WINTER 2015 / Vol. 89 No. 1

© SCOTT KIRKWOOD/NPCA

Preserved, In Antiquity

Imagine what the National Park System would be like without the Grand Canyon, Devils Tower, the Statue of Liberty, or Death Valley.

Presidents Theodore Roosevelt, Calvin Coolidge, and Herbert Hoover all used a law, called the Antiquities Act, to set aside these places as part of the park system. Since 1906, all but three presidents—Democrats and Republicans—have used their power under the Antiquities Act to protect 134 sites across the country.

The law authorizes the President to use his executive authority to better protect federal public land by proclaiming it a national monument. Recently, President Obama used the law to establish monuments to Harriet Tubman, Cesar Chavez, and Charles Young Buffalo Soldiers, sites that tell stories that are often overlooked.

Last year, some members of Congress came alarmingly close to weakening this extraordinary law, which is so important to the future of our park system.

For more than a century, presidents have had the ability to protect wild landscapes, such as Death Valley, and historically important sites, such as Thomas Edison's laboratory, in the face of potential threats or congressional inaction. That authority is needed now, as much as it ever was. Our park system will *always* be a work in progress, because history does not end.

The newly elected Congress needs to recognize the importance of the Antiquities Act as a way to protect our national heritage. Preserving the law is about preserving the future of the park system. We want to make certain that our celebration of the first 100 years of the National Park Service celebrates its future as well.

Clark Bunting

Editor's Note

COLIN PITHER on the journey to Mount Rainier's ice caves

Happy Returns

This issue of *National Parks* magazine is all about people retracing steps on extraordinary journeys. A man returns to Mount Rainier's ice caves and brings a group of researchers to document a realm practically unknown to science. A handful of travelers revisit the 1920 route of explorer Robert Limbert, whose reports of Craters of the Moon played a key role in the park's designation. And a man takes a bittersweet journey to his deceased wife's favorite places, including Yellowstone, scattering her ashes along the way.

The impulse to return is a powerful one. Whenever I plan a trip, I struggle to decide if I'll go somewhere new or head back to an old favorite. There's something to be said for that familiar feeling you get when rounding a turn or cresting a hill, already knowing what's on the other side. Or the sense of nostalgia that comes with remembering when you first set foot on a trail. Your favorite spot might not seem quite so perfect, or it might seem even better than you remembered. Where you once enjoyed a moment of quiet contemplation, you might be joined by a friend or family member who sees the landscape through new eyes. And the passage of time might render that 10-mile hike a little more challenging than it once was. In the end, revisiting those places is like rereading a favorite book—the words often have a different impact, because we are different people.

Scott Kirkwood
NPMAG@NPCA.ORG

National Parks

EDITOR IN CHIEF: Scott Kirkwood
ASSOCIATE EDITOR: Rona Marech
ART DIRECTOR: Annie Riker
PHOTO EDITOR: Nicole Yin
FEATURES DESIGN CONSULTANT: Jessie Despard/Despard Design

NATIONAL PARKS
777 6th Street NW, Suite 700, Washington, DC 20001-3723
202.223.6722; npmag@npca.org

ADVERTISING INQUIRIES
YGS Group
3650 West Market Street, York, PA 17404

Natalie Matter DeSoto: 717.580.8184 | natalie.desoto@theYGSgroup.com
Marshall Boomer: 800.501.9571 x123 | marshall.boomer@theYGSgroup.com

PRINTED ON 10% POST-CONSUMER WASTE RECYCLED PAPER

NATIONAL PARKS CONSERVATION ASSOCIATION

Printed with inks containing soy and/or vegetable oils

The Audit Bureau

FSC www.fsc.org MIX Paper from responsible sources FSC® C084269

WHO WE ARE
Established in 1919, the National Parks Conservation Association is *America's only private, nonprofit* advocacy organization dedicated solely to protecting, preserving, and enhancing the U.S. National Park System.

WHAT WE DO
NPCA protects and enhances America's national parks for present and future generations by identifying problems and generating support to resolve them.

EDITORIAL MISSION
National Parks magazine fosters an appreciation of the natural and historic treasures found in the parks, educates readers about the need to preserve those resources, and illustrates how member contributions drive our organization's park-protection efforts. The magazine uses the power of imagery and language to forge a lasting bond between NPCA and its members, while inspiring new readers to join the cause. *National Parks* magazine is among a member's chief benefits. Of the $25 membership dues, $6 covers a one-year subscription to the magazine.

MAKE A DIFFERENCE
Members can help defend America's natural and cultural heritage. *Activists alert Congress and the* administration to park threats; comment on park planning and adjacent land-use decisions; assist NPCA in developing partnerships; and educate the public and the media. Please sign up to receive Park Lines, our monthly e-mail newsletter. Go to npca.org to sign up.

HOW TO DONATE
To donate, please visit npca.org or call 800.628.7275. For information about bequests, planned gifts, and matching gifts, call our Development Department, extension 145 or 146.

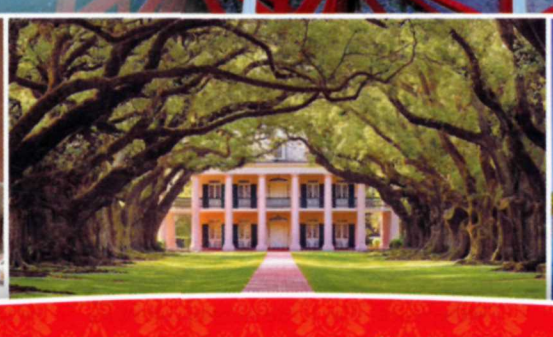
QUESTIONS?
If you have any questions about your membership, call Member Services at 800.628.7275. On a selective basis, NPCA makes its membership list available to organizations that our members find of interest. If you would like your name to be removed from this list, please call us at the number listed above.

HOW TO REACH US
National Parks Conservation Association, 777 6th Street NW, Suite 700, Washington, DC 20001-3723; by phone: 1.800.NAT.PARK (628.7275); by e-mail: npca@npca.org; and npca.org.

AMERICAN CRUISE LINES

Introducing The World's Newest Riverboat

Be the first to cruise on the *American Eagle*. American Cruise Lines is expanding its fleet with a brand new paddlewheeler on the Mississippi River. The *American Eagle* will offer the best of everything as it cruises the American Heartland. Learn more about reserving a stateroom for the inaugural season today.

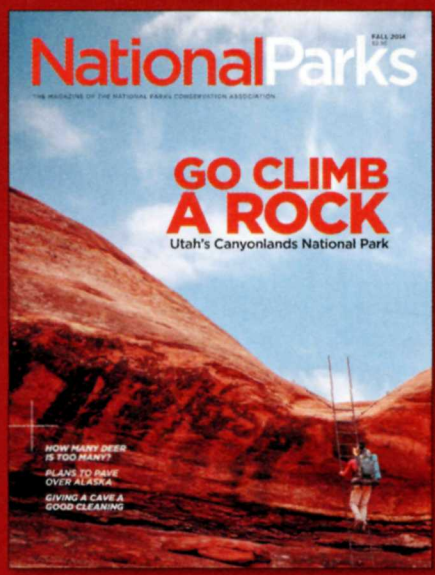


www.americancruiselines.com

Call toll-free 1-866-229-3803

Reservations office open 7 days a week

2014 Condé Nast Traveler Readers' Choice Awards FINALIST



ON RED ROCKS

I want to congratulate Heidi Ridgley and Morgan Heim for the "Red Rocks" story and photos. Two years ago, my wife and I celebrated our 30th anniversary with a 7,000-mile U.S. trip. Much of the focus was on national parks in Utah and Arizona, including Arches, Canyonlands, and Grand Canyon. As anyone who's traveled this area knows, it's one spectacularly gorgeous experience after another.

I have shared the article with several friends who are ardent climbers and explorers, and all have agreed that the article "hit the spot." As a long-time Northwest newspaper reporter, I always love it when someone pens a phrase that sends chills up and down one's body. The words, "the windless night made the silence so powerful I could almost hear it" brought back warm memories of Canyonlands. I knew what she was saying—thank you for capturing the experience.

CRAIG WECKESSER
Rochester, WA

COURTING CONTROVERSY

I was saddened and disappointed to read the response to an article about the Park Service's efforts to add LGBT (lesbian, gay, bisexual, and transgender) sites to the Park System [Fall 2014]. A couple of people wrote that they were "appalled" and "offended," and one called this a controversial, socio-political issue.

However, in the same magazine, there was an article about building a highway at the edge of the Gates of the Arctic National Park for the exclusive benefit of a mining company, and another about rising sea levels and the long-term effect on coastal parks. Another story pits an individual's right to fly a drone against the rights of others seeking peace and stillness. How these subjects are not controversial and socio-political issues but LGBT sites are, I fail to comprehend.

The truth is that the Park Service preserves many areas, some of which may disturb any one of our social-political sensibilities. This is the genius of the system, preserving not only those sites that celebrate our greatness and victories, but those that also show our failures as a nation, too. Would anyone want us to eliminate Manzanar National Historic Site in California and Minidoka National Historic Site in Idaho because they preserve World War II internment camps for Japanese Americans? Should we forget about Nicodemus National Historic Site in Kansas because it was a community only for former slaves? Should we forget about World War II Valor in the Pacific National Monument, better known as Hawaii's Pearl Harbor, and the disaster that recalls? And isn't it controversial and a socio-political issue to have the Trail of Tears, which commemorates the forced relocation of nearly 125,000 Native Americans? Many more sites could be mentioned, depending on any individual's particular political, religious, or moral values.

The idea that we should withhold our support from NPCA because of what our magazine reports the Park Service is doing (as the writer suggests) is juvenile. None of us can say we agree 100 percent with the actions of the Park Service, Congress, or the President, but that doesn't mean we will stop loving the sites we are able to visit and learn from. Our membership in NPCA is one way we can show our

wholehearted support of all of our 401 Park Service sites.

REV. ROBERT L. ANDERSON
York, PA

NO MORE DRONES

My wife and I just had the pleasure of traveling to Bryce Canyon, Capitol Reef, and Zion National Parks as well as Red Rock Canyon National Conservation Area. While in Red Rock Canyon, I observed a tourist flying a drone, and my first thought was, "Wow, what a neat way to get a good picture of the faraway landscapes and hills." I was not thinking about the environmental impact at the time. Not until I turned the page to Amy Leinbach Marquis' article ["Flight Plan"] regarding a drone crash at Yellowstone—one of my favorite places on Earth—did I get angry. My immediate thought was that drones should be forever banned in all national parks. I can understand their value to park rangers and search-and-rescue units, but not to the typical tourist who just wants to take a picture.

RICHARD ERCKMAN
Hanover, PA

A BILLION-DOLLAR MESS

Another fine article ["A Billion-Dollar Driveway"]. One wonders if this culture has the discipline to sustain the last of the best of the natural world.

RANDY KANE
Crawford, NE

"A Billion-Dollar Driveway," Seth Kantner's earnest plea to keep mining and the roads that mines require out of the pristine Brooks Range, is a real cry in the wilderness. Northern Alaska, remote, large, and wild, is sufficiently valuable to preserve for those qualities alone. Yes, we have national parks in southern Alaska and the lower 48 that protect special areas. The Brooks Range, however, is different in that it is home for native tribes whose livelihood depends on the animal life and unpolluted landscape of true wilderness. The author makes a convincing argument in favor of keeping it as it is.

SALLIE VANARSDALE
Sarasota, FL

I just finished ripping out almost every article in the Fall 2014 issue. That's how intriguing, informative, and well-written they were. Having spent two weeks in July in Red Rock country, reading Heidi Ridgley's adventure brought back similar memories. Now I'll have to return to the area with an outfitter so I can get to some of those remote areas she recommended. The deeply held sentiment expressed by Seth Kantner in "A Billion-Dollar Highway" moves me to ask you to whom I can write to support the preservation of the magnificent but threatened wilderness of northern Alaska.

RONI SILVERBERG
San Francisco, CA

The road was proposed by Alaska Gov. Sean Parnell, who was recently voted out of office, but the fight isn't over. NPCA members can send their thoughts to Gov. Bill Walker, Office of the Governor, P.O. Box 110001, Juneau, AK 99811-0001. —Editors

CORRECTION:

The article about Utah's Canyonlands ["Red Rocks"] misidentified what makes "desert varnish" dark in color. Manganese oxides contribute to the varnish—not magnesium oxides.

Send letters to National Parks Magazine, 777 6th Street NW, Suite 700, Washington, DC 20001-3723. **Or e-mail** npmag@npca.org. Include your name, city, and state. Published letters may be edited for length and clarity.

They are proposing something that has such grave impacts, that benefits so few, and... is opposed by so many.

David Lamfrom, associate director of NPCA's California Desert program, quoted in the Los Angeles Times *in response to a Spanish energy firm's proposed wind and solar project near Mojave National Preserve and Death Valley National Park, which would cause "significant, irreversible and likely unmitigatable" damage, according to the Park Service. As this issue went to press, the Bureau of Land Management had just rejected the solar portion of the project, marking a significant victory for parks in the region.*

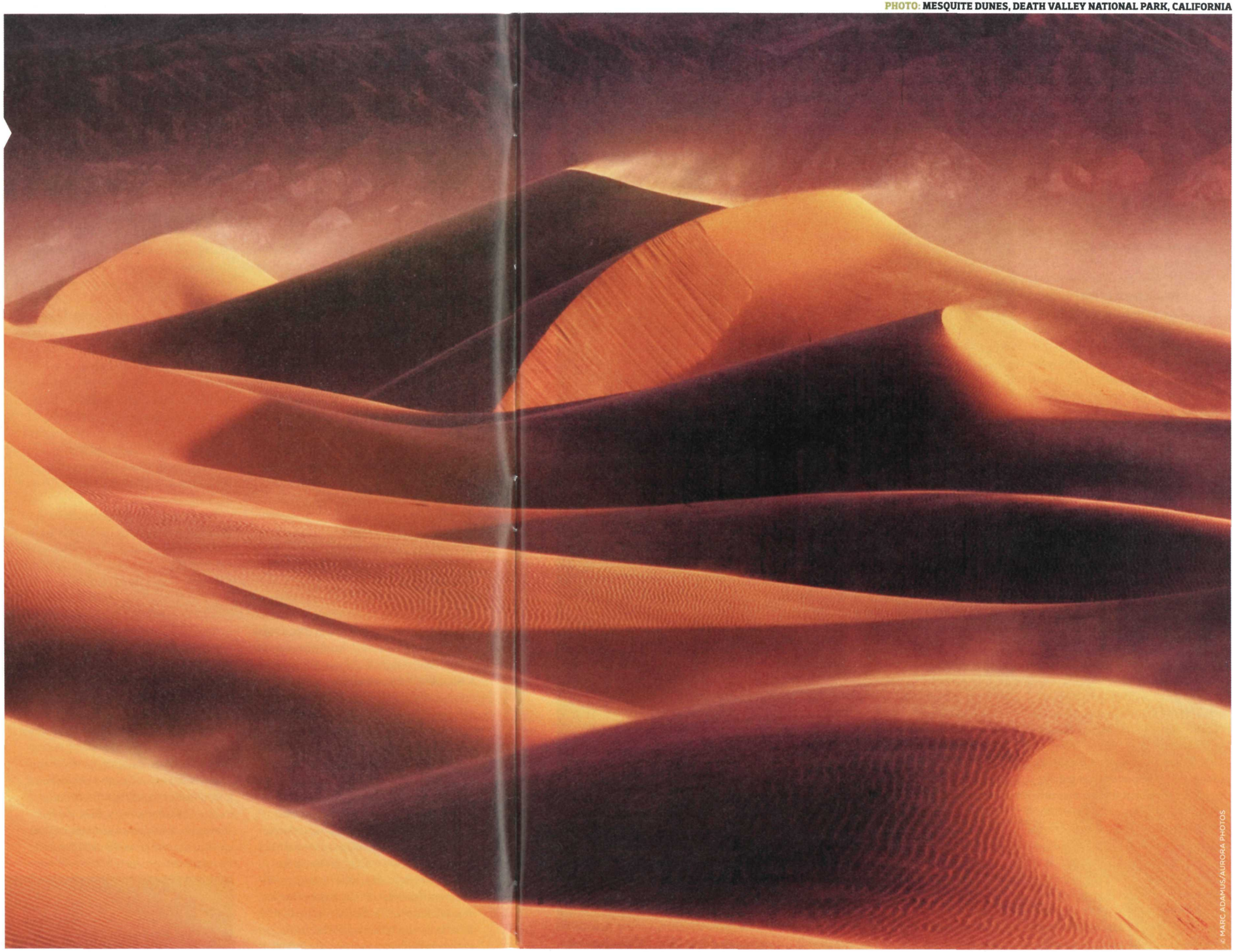
It's every community's right to go to the president and say, 'We just can't get this passed by Congress, can you step in and help us?'

Kristen Brengel, NPCA's senior director of policy, quoted in the* Washington Post *in support of the Antiquities Act, a 1906 law that empowers the president to create new national monuments. The law has come under fire from conservative members of Congress in spite of its historically bipartisan use to designate sites such as Grand Canyon, Muir Woods, and Zion.

This is really a message of hope. We can set things right again. [We can put] things back the way they should have been.

Rob Smith, director of NPCA's Northwest regional office, quoted by KOMO-TV regarding the removal of two dams on the Elwha River in Olympic National Park, Washington state. The largest dam-removal project in U.S. history is now complete, and is expected to bring hundreds of thousands of salmon back to the region.

PHOTO: MESQUITE DUNES, DEATH VALLEY NATIONAL PARK, CALIFORNIA



A FIREFIGHTER ignites brush with a drip torch, not far from the Pennsylvania Memorial.

SCOTT KIRKWOOD/NPCA

Fired Up

Prescribed fires are standard practice at sprawling landscapes throughout the West, and now the fields and forests at historic sites have become the Park Service's latest target.

The firefighter started the blaze quietly. A click of a lighter, a splash of burning fuel, and suddenly, orange flames were snaking through tall grasses at Gettysburg National Military Park in Pennsylvania. Smoke blew across a long, quiet field, and ash whirled into the sky and floated away like so much black confetti.

Wait—setting a fire? At a Civil War site? Near monuments, cannons, farms, and fences? It can be a little confusing at first, even for the Park Service. After all, the biggest thing on the agency's arrowhead is a tree. But prescribed fire is a tool that is being used increasingly at historic parks and cultural sites with precious archaeological resources.

In Gettysburg, the fires restore open grasslands, an important but quickly disappearing habitat for species such as sparrows and the Eastern meadowlark. The main reason the Park Service torches the landscape at Gettysburg and other historic sites, however, is to maintain historical accuracy. At the time of the Civil War, Gettysburg was a mosaic of farms, open fields, and scattered trees, and the Park Service wants to return the site as much as possible to its 19th century appearance.

"It comes right down to: Why does this park exist?" says Katie Lawhon, management assistant at Gettysburg. Visitors come to learn the story of the battle, she says, but it confuses them if (for example) cannons are pointed at dense woods that didn't exist in 1863. "If no one can understand what this artillery battery did, then something is wrong," she says.

It took Lawhon a while to adjust to the idea of using fire ("Smokey Bear syndrome," as some call it), but by the time Gettysburg undertook its first burn last year, she was a convert. Fire is often cheaper and more efficient than the alternatives, such as herbicide, mowing, or cutting, and the negative impact is minimal.

In the West, the use of prescribed fire in national parks is far past the point of debate. Controlled burns are used to prevent devastating wildfires by reducing underbrush, dead trees, and other hazardous "fuel." They also clean

"It's always a little nerve-wracking when you unleash fire onto land."

forests—making way for desirable plants and big trees, removing pesky non-native growth, improving wildlife habitat, and returning nutrients to the soil.

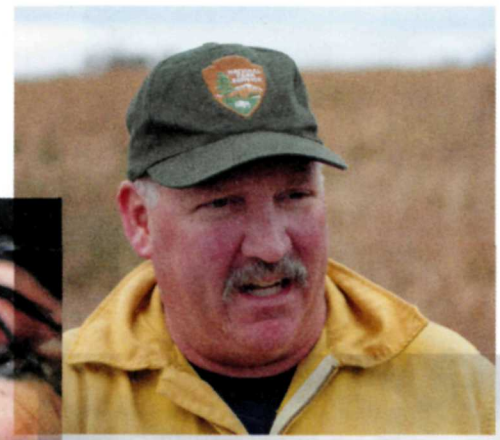
"Fire is a native part of the ecosystem. It belongs there... It's really an extension of the weather," says Tom Ribe, a longtime firefighter who wrote about a prescribed fire disaster and how it changed Park Service practices in his 2010 book, *Inferno by Committee*. "You can't simulate what fire does with anything else."

That wasn't always the Park Service's philosophy. Early superintendents at Sequoia National Park recognized that excessive fire suppression was actually increasing the chances of a destructive wildfire, and as early as 1904 began experimenting with controlled burns, violating Park Service rules. That policy finally changed in 1968, and the use of prescribed fire has been growing ever since. Between 2009 and 2014, 134 park units conducted controlled burns, from Yosemite to Cape Cod, and Antietam to the Everglades.

At Gettysburg, the late October burn had been carefully planned, but even the most seasoned fire veterans acknowledged that it's intimidating to work in an iconic military park, near historic structures—not to mention a town.

"Gettysburg is hallowed ground. It ratchets up the anxiety," said Cliff Lively, the burn boss and a fire management officer at Delaware Water Gap National Recreation Area in Pennsylvania and New Jersey. "It's always a little nerve-wracking when you unleash fire onto land."

And exciting, too. Some of the 25 firefighters, who had come from as far as New York, were neophytes who had completed a basic fire training course at



© SCOTT KIRKWOOD/NPCA (3)

CLIFF LIVELY (top), who oversaw the prescribed fire at Gettysburg, had carefully laid plans to burn 30 acres but hadn't counted on the soggy ground and cloudy skies. LEFT: A handful of ashes left in the fire's wake. BELOW: Firefighters survey the early results.

BATTLEFIELD REHAB

Prescribed fire is only one method Gettysburg has used to return the landscape to its historical condition. Over the last 14 years, the Park Service has removed 354 acres of oak, hickory, and other native hardwood trees to re-open the scene of infantry attacks and lines of fire. Staff have also cut back the trees in 278 acres of historic woodlots, where farmers grazed animals and grew timber for construction and fuel for their homes. Finally, the agency has rebuilt 20 miles of fencing, and replanted 48 acres of woods and 121 acres of orchards that existed at the time of the fighting. Farmers grew a variety of fruits in 1863, but the new orchards are limited to only two: Messina peach trees and seven varieties of apple trees.

Gettysburg over the summer. In a wildfire, they would have limited duties, but here, "they get up close and personal," Lively said.

The plan was to clear 30 acres that had been agricultural lands in 1863. The main target was woody vegetation—namely, cedar—that looks harmless enough, but if left untouched, could grow into a forest. The area around the fields had been mowed and watered, the engines were ready, the hoses were out, and after a last huddle, firefighters ignited the yellow grasses, using drip torches to spread flaming liquid.

The fire flared. And died down. They tried again. The flames crackled and stretched upward, and the Pennsylvania Memorial, a 100-foot-tall monument, turned wavy behind a scrim of smoke. And then the fired sputtered out, leaving black ribbons in its wake.

They had been hoping for a wall of flames and charred, flat earth, Lively said, but the soil was soggy from an earlier rain and it wasn't drying out fast enough. Meteorologists had predicted a partly cloudy day, but there were only two thin strips of blue in an angry-looking, gray sky.

After one more attempt—a "last dying gasp" Lively said—the crew called it quits. In the end, they burned around 13 acres.

Lively didn't sound terribly discouraged as he gathered the firefighters to debrief. It was good practice for the new trainees, he pointed out; they would just have to come back again another day in 2015.

"The forecast was a joke," he said with a shrug. "But you can't fight Mother Nature."

—RONA MARECH

THE BOOKS ARE FREE

THE ADVENTURE IS PRICELESS

GET YOUR FREE ALASKA AND YUKON GUIDES!

Go on an adventure you'll treasure the rest of your life. Request your FREE official travel guides today.

Return our reply card or request the guides online at

AlaskaYukon.org/np

THE TRADITIONAL CHINESE DRAGON KITE embodies a mythical symbol of power (left). In "Blossom," Ai Weiwei transforms utilitarian fixtures into porcelain bouquets (right). Artist Ai Weiwei in his studio (bottom).

© RYAN CURRAN WHITE/PARKS CONSERVANCY

© ALISON TAGGART-BARONE/PARKS CONSERVANCY

© JAN STÜRMANN, COURTESY OF THE FOR-SITE FOUNDATION

Art on the Rock

Chinese Artist Ai Weiwei explores freedom and creative expression using Alcatraz as his canvas.

Some strange things are happening on Alcatraz.

Punk rock and poetry echo from vacant cells. Chipped sinks overflow with porcelain flowers, Legos cover a concrete floor, and a Technicolor dragon floats behind reinforced doors. In the main cell house, hundreds of free hands scrawl messages of hope to prisoners around the world.

Through April 2015, this stark outcropping in San Francisco Bay—a part of the Golden Gate National Recreation Area—is home to an installation by Chinese artist and activist Ai Weiwei. Through sculpture, mixed media, and sound recordings, @Large: Ai Weiwei on Alcatraz takes on an ambitious range of related themes: freedom of expression, imprisonment, the responsibilities of citizenship, and the role of transparent communication in a just society.

Ai Weiwei, 57, is no stranger to the subject matter. A vocal and irreverent critic of the Chinese government, Ai has been censored, surveilled, detained, and beaten by authorities in his home country. He has been prohibited from leaving China since 2011, following an 81-day stint in solitary confinement and subsequent conviction on a charge of tax evasion that he and his supporters say is trumped up.

The seven works in @Large explore Ai's experiences criticizing authority, located within a global mosaic of activism. One installation offers pixelated portraits of political prisoners from 33 countries, including the United States, rendered in Legos pieced together on the floor. Next door, a suspended Chinese dragon kite snakes between pillars, panels in its body carrying quotations from imprisoned activists.

Elsewhere, sound recordings play in a dozen cells. Stepping into each cell, visitors are immersed in Nigerian musician Fela Kuti's signature AfroBeat, then Martin Luther King, Jr., speaking out against the Vietnam War, then a protest song by Russian punk band Pussy Riot. Out in the corridor, the dissonant recordings blend into a melee representing more than half a century of creative political expression from around the globe.

@Large is intricately woven into its

Ai Weiwei has fashioned a space for unguarded and sincere public discussion from the remnants of a federal prison.

iconic prison setting, though the artist behind it has never set foot on the island. To bring the exhibit to life, Ai partnered with the FOR-SITE Foundation, a group promoting place-based art. Its director, Cheryl Haines, visited Ai in Beijing. She brought detailed notes on the size and feel of Alcatraz's salt-worn structures, which Ai relied on to create the exhibit. The works were produced by artists and volunteers in Ai's Beijing studio and on Alcatraz, who took painstaking care to preserve the island's fragile natural and cultural resources.

Despite the logistical challenges, FOR-SITE, the Park Service, and supporting partner, the Golden Gate National Parks Conservancy, were motivated by the extraordinary potential of bringing Ai's art to a place so rich with social meaning.

"The National Park Service preserves so many places that help tell the story of our country. We're always looking to tie our history to contemporary issues," says Kate Bickert, director of Park Initiatives and Stewardship with the Golden Gate National Parks Conservancy. "Ai Weiwei takes on themes that are relevant to the history of Alcatraz in a way that encourages visitors to open a conversation about the world we live in now."

The final work in @Large at first seems the most mundane: wooden tables, ballpoint pens, and a shelf holding stacks of postcards. Visitors are invited to write a message on a card, preaddressed to a prisoner whose story is told elsewhere in the exhibit. It's an anachronistic, visceral way for each visitor to hook into the ongoing narrative of international human rights at the center of @Large.

And it's where the conversations begin. Parents and kids talk about what it would be like to be locked away for speaking your mind. Strangers sit down to the same table and share their reactions. "People ask each other, 'Who are you writing to and why?'" says Bickert.

Beyond conceiving the intricate works that make up @Large, Ai Weiwei has accomplished something remarkable: He has fashioned a space for unguarded and sincere public discussion from the remnants of a federal prison.

"That's the great value of working with creators," says Howard Levitt, spokesperson with the Golden Gate National Recreation Area. "They see the world in a different way."

—JULIA BUSIEK

@Large is part of Art in the Parks, a public art initiative in the Golden Gate National Recreation Area. Art in the Parks has invited artists like Andy Goldsworthy, Mark di Suvero, and Jeannene Przyblyski to create place-based installations that cast new light on the rich natural and cultural landscapes of the Golden Gate National Parks. Visit www.parksconservancy.org for a listing of events and activities.

MAINTAINING HISTORIC ADOBE BUILDINGS presents enormous challenges, but ancient techniques are now back in vogue.

Like a Good Neighbor

The Park Service teams up with its Mexican counterparts and the University of Arizona to master the intricacies of adobe preservation.

In 1691, a priest named Father Kino visited a village in modern-day Arizona, home to Native Americans known as the Tohono O'odham or "desert people." As one of many priests charged with increasing Spain's reach in the New World, Father Kino established the first Spanish Mission in the area, which would be called Tumacácori (Too-muh-KUH-ko-ree). Here, the Catholic Church taught native people new farming methods, a new religion, a new language, and eventually a new way of building structures—with adobe bricks.

Earthen building techniques had been used to create structures long before the arrival of the Spanish (think Casa Grande), but by pouring mud into forms to create bricks, builders could create more permanent, varied structures. Beginning in 1800, Tumacácori's community devoted nearly 25 years to building the church that stands today, and forms the heart of a national historical park.

But nearly 200 years after Father Kino's arrival, the Park Service was struggling to maintain the buildings. Although adobe is still used to build homes throughout Latin America, China, and Africa, adobe construction in America has nearly vanished in favor

(cont'd)

"From a sustainability perspective, adobe is an incredibly efficient material that has allowed many cultures around the world—particularly desert cultures—to tolerate extreme temperatures, both hot and cold. It's easy to use and affordable: Everywhere in the world, there is earth that you can use to build a dwelling, regardless of wealth."

–R. Brooks Jeffery

JUST STIR AND ENJOY

Smucker's, Adams and **Laura Scudder's** Natural Peanut Butters are proud sponsors of the National Parks Conservation Association and its efforts to protect and enhance America's National Parks. So make a natural difference by choosing any one of them. It's a small choice that can lead to a great change.

naturaldifference.com

PROUD SPONSOR
NATIONAL PARKS CONSERVATION ASSOCIATION

of cement, drywall, and two-by-fours.

"Traditional crafts in Mexico have more longevity than in the United States," says Jeremy Moss, an archaeologist who worked at Tumacácori for nine years, before becoming the chief of cultural resources at Pecos National Historical Park in New Mexico. "In Mexico and in some places in the American Southwest, that knowledge is still in the family and it's a part of growing up; many Mexican families have an adobe building and know all its properties, and understand how to keep it up; in the United States, few people have those skills." And that makes it hard to find workers who can care for sites like Pecos and Tumacácori.

ing materials, adobe is essentially dirt (containing clay) and water combined with sand (and sometimes straw) that acts as a binder. The mixture is put into molds while still wet; once dry, the components form a porous brick that absorbs water in the atmosphere. But if the adobe stays wet for too long, the clay-sand bond starts to break down, and the walls of a building deteriorate, or "pooch out" and eventually fail.

From the 1930s to the 1970s, many caretakers of historic sites in the United States encased adobe structures in cement, which trapped moisture, slowly destroying the adobe bricks beneath, and eventually turning them into heaps of dry powder.

"Many Mexican families have an adobe building, and know how to keep it up. In the United States, few people have those skills."

To bridge that gap, the Park Service has teamed up with Mexico's Instituto Nacional de Antropologia e Historia, the University of Arizona, and New Mexico's Cornerstones Community Partnerships to share best practices and ensure that these structures remain in place for the next century. At the center of this partnership is a series of workshops that bring Mexican and American master teachers and participants together to discuss the technical aspects of adobe construction, preservation and restoration, in English and Spanish, for experts and novices alike. So far, more than 50 Park Service employees from 15 Southwestern park units have participated; the next workshop will be offered in, Alamos, Mexico, in March.

One of the most efficient, inexpensive, and widely available build-

"We found out that our shortcuts just don't work," says Karl Cordova, superintendent at Pecos. "In Mexico, instead of putting concrete and some mud on a structure every five to ten years, they just put native mud on top of native mud every other year. Their labor costs are much lower than in the United States, so they just bring in a crew of skilled laborers to do more frequent work—it's cheaper and better for the resource." Now the Park Service is carefully removing concrete wherever possible, and replacing it with a more traditional coating of lime and mud, or a substance called Rhoplex which doesn't trap moisture as much as concrete.

But that more practical approach presents a philosophical problem.

"Restoration is more accepted in Mexico primarily because many historic adobe buildings are still in use many communities—they're functioning churches or municipal buildings," says Moss. "But in the Park Service, we've come to value the original fabric as much as anything else—the idea that what you're looking at is 1700s or 1800s adobe. That idea of preserving a ruin in a ruined state can seem foreign to some. 'You can't fool time,' they'll say, 'so you might as well just start rebuilding it now.' And it's true. These buildings were meant to change and to be maintained, so preserving them in a ruined state can pose serious challenges."

Although most of the hands-on knowledge flows from Mexico to the United States, the Park Service brings plenty to the table.

"The Mexicans are learning a lot about the kind of stewardship strategies the Park Service is using," says R. Brooks Jeffery, a professor at the University of Arizona's College of Architecture, Planning, and Landscape Architecture. "They're learning to answer questions like: How do you balance access to a site with its protection? How do you handle visitors? How do you maintain financial sustainability for some of these places? Those are areas where the Park Service has really advanced compared to our Mexican counterparts."

In the end, both sides will tell you it's about much more than saving a pile of bricks.

"Many of the people who visit these buildings are descendants of those who built the structures, so there's a strong connection between the people and the buildings," says Cordova. "There's a certain pride you can see in that shared heritage, an appreciation when those young people put their hands on the walls that their great-great-great-great-grandfathers built. We give them an opportunity to build bricks that go into our preservation program, so they know their work lives on, along with their ancestors."

—SCOTT KIRKWOOD

NationalParks

STATEMENT OF OWNERSHIP, MANAGEMENT AND QUARTERLY CIRCULATION

OWNER AND PUBLISHER
National Parks Conservation Association

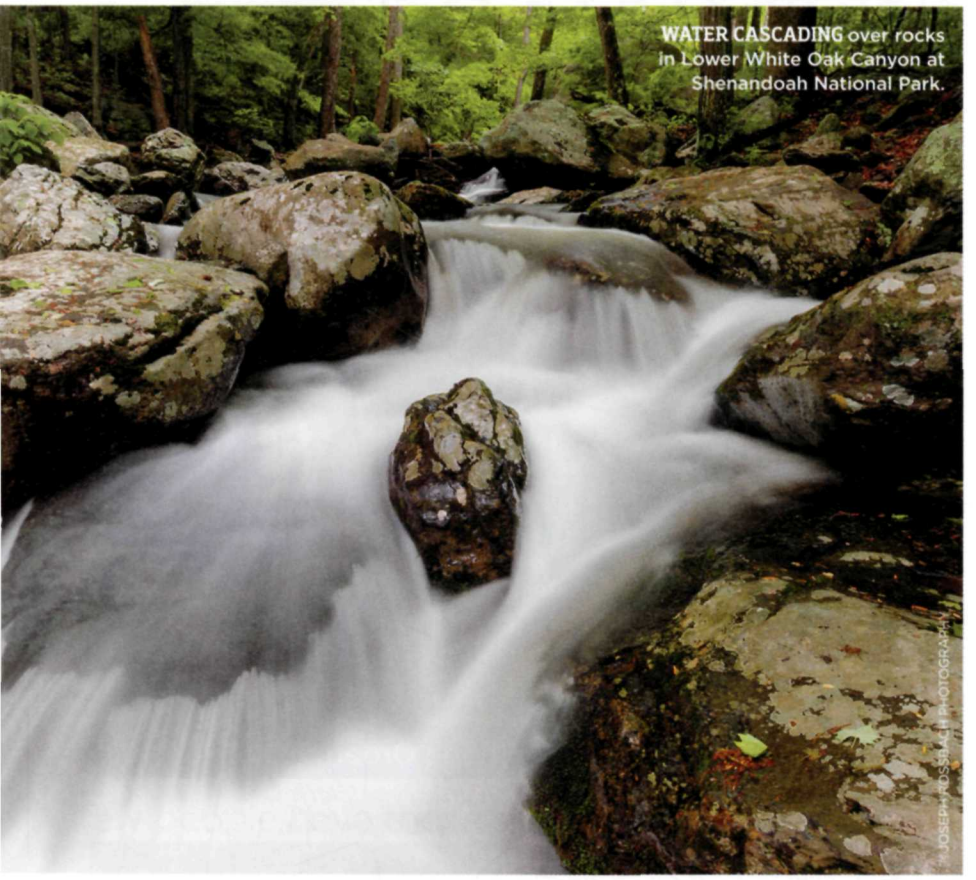
EDITOR IN CHIEF AND MANAGING EDITOR
Scott Kirkwood

HEADQUARTERS OF PUBLISHER AND PUBLICATION
777 6th Street NW, Suite 700, Washington, DC 20001-3723

STOCKHOLDERS, BONDHOLDERS, MORTGAGE

AND OTHER SECURITY HOLDERS
None

	Winter 13 through Fall 14	Single-issue filing date Fall 14
A. TOTAL COPIES PRINTED (net press run)	314,310	315,739
B. PAID CIRCULATION Mail subscriptions	305,874	307,409
C. TOTAL PAID CIRC.	305,874	307,409
D. FREE DISTRIBUTION	3,883	3,806
E. TOTAL DISTRIBUTION (sum of C and D)	309,756	311,215
F. COPIES NOT DISTRIBUTED	4,554	4,524
G. TOTAL (sum of E & F)	314,310	315,739



WATER CASCADING over rocks in Lower White Oak Canyon at Shenandoah National Park.

What the Streams Say

At Shenandoah National Park, research shows that the Clean Air Act is working—but in some places, healthy streams are still a distant dream.

THE CLEAN AIR ACT has been a roaring success if you're looking at how much pollution falls out of the sky. Emissions of sulfur dioxide from power plants—the pollutant that causes most acid rain—plummeted nationally from 17.5 million tons in 1980 to 3.3 million tons in 2012. That decline is astonishing in anybody's book.

But if you're interested in the health of America's streams, the effect of the 1970 law isn't nearly so dramatic. That's because rain isn't the only thing that determines what's in the water; the soil and rock that streams flow through are also critical. Consequently, although the landmark legislation (and especially its 1990 amendments) has had a major impact in some places, in others, change is barely detectable.

East of the Mississippi, where acid rain has always been the worst, the Adirondack Mountains have seen the greatest improvement in stream health. There, the amount of acid-producing sulfate declined in 90 percent of the streams being monitored from 1990 to 2008. To the south, in central Pennsylvania, sulfate concentrations also fell in a majority of streams. But in the Central Appalachians (including Virginia's Blue Ridge Mountains), improvement was the exception: Sulfate declined in only 12 percent of monitored streams.

Something different is going on there. And Shenandoah National Park is helping reveal what it is.

Seventy-five miles southwest of the nation's capital, Shenandoah is home to the longest study of water quality in any national park. The research is shedding light on "risk factors" for slow recovery from decades of acid rain.

The park is well placed for the task. The western slope of its mountains catches both dry pollution and acid rain from the industrial Midwest. Along with Great Smoky Mountains to the south, Shenandoah is more affected by acid rain than any other place in the National Park System. It's also a good place to monitor the effects of acid rain because the water in these "headwater" streams comes only from rain, snowfall, and springs, not from lakes, ponds, or other watercourses.

"National parks are great places to do science because they let us control for things that we can't in landscapes where there's more human interference," says Ami Riscassi, a scientist at the University of Virginia (UVA). "If you look at stream

water in, say, Charlottesville, there are too many other things going on."

UVA researchers began sampling Shenandoah water in 1979, visiting two streams at the southern end of the park each week to measure such variables as pH (acidity), temperature, and the concentration of key chemical compounds and elements. Two more streams were added to the study and devices were installed to grab samples during gully-washing storms.

Findings from the park's program were added to data from the Virginia Trout Stream Sensitivity Study, which in 1987 tested water at 379 sites, about 60 inside the park. A subset of the streams was then regularly monitored, and the original sites were resampled in 2000 and 2010. At the last outing, 165 people in sneakers and hip boots spent 1,500 hours scooping water into plastic jars.

The result is an unusually detailed record of Shenandoah's water quality and how it's changed (or hasn't) over 35 years.

Shenandoah is home to the longest study of water quality in any national park.

A recent analysis of the two studies' data found that whereas one-third of the park's streams were classified as "acidic" in 1987, in 2010 only one-sixth were. Over the same period, the concentration of acid-causing sulfate declined and the streams' chemical capacity to offset acidity rose on average. The trouble was that 16 percent of the streams showed little improvement. A few actually got worse.

"It's a good news, bad news story," says Rick Webb, the UVA scientist who coordinated the two studies before turning the task over to Riscassi this year. "We have reversed the damage for many systems. But some are so damaged they're going to take a while to recover."

The biggest risk factor for continued poor health appears to be geology.

All of the still-acidic streams in Shenandoah flow through soil made from weathered sedimentary rock, which underlies about one-third of the park's surface area. (The rest of the park is equally divided between basaltic and granitic bedrock.) Grains of sand and clay in the sedimentary soil bind sulfate molecules, keeping some of the acid-producing chemical out of the water. But after a century of acid rain, the sedimentary soil is saturated with sulfate. It releases some of the load after each rainstorm—even though the rain itself now contains little sulfate.

As a consequence, streams in sandy watersheds are still acidic, and streams in rockier watersheds have seen acidity decline along with the fall in sulfate pollution.

"Even now, if we were somehow able to stop acid rain, those streams would be running acid for many decades because of that bankroll of sulfur," says James P. Schaberl, chief of natural and cultural resources at the park.

None of Shenandoah's streams were acidic before modern times. Political action—specifically, implementing regulations that reduce power-plant emissions—has been necessary to move them back toward their primordial state. More stringent regulations may be necessary to hasten the process.

Nevertheless, progress is undeniable.

"The people before me had the great foresight to say we need to understand whether these emission reductions are improving the environment," says Richard Haeuber of the Environmental Protection Agency's Clean Air Markets Division. "Is it working? Is it worth the effort being spent? Yes, the Clean Air amendments have worked."

But Shenandoah National Park makes clear the work isn't done. **NP**

DAVID BROWN is a freelance science writer and former reporter for *The Washington Post*.

BABBLING BROOKS

Brook trout, the object of desire for many a fly fisherman, tolerate acidic streams better than most fish. So when a stream loses its "brookies," scientists know the water is in a toxic state. In Shenandoah, the brook trout population has remained stable overall, but their numbers are depressed in the most acid-sensitive watersheds.

© VIRGIL BECK, COURTESY OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES

THE MODEL CAVE AMPHIPOD has only been found in a single cave at Nevada's Great Basin National Park.

A Tiny Discovery

Researchers recently discovered a new species in Great Basin National Park. But will its habitat go down the drain?

ONE OVERCAST NOVEMBER MORNING IN 2008, Gretchen Baker, an ecologist for Nevada's Great Basin National Park, and Ben Roberts, the chief of natural resources, set off to map Model Cave. The pair donned helmets and yellow waterproof suits, hiked through snowy piñon-juniper woodland, and slid into the narrow entrance of the cave, not far from the Pole Canyon Picnic Area. Over several hours, they belly-crawled through dusty passageways barely taller than a car tire, squeezed through holes, shimmied up muddy slopes, and waded through frigid water.

Like other caverns in Great Basin, Model Cave's water level rises and falls with the seasons, but on occasion it can rise 15 feet in one day. Sure enough, as they retraced their steps toward the entrance of the cave, the water in one pool had risen enough to catch their attention.

Roberts peered into it and noticed, to his surprise, something wiggling. The pair got down on their hands and knees and saw several tiny shrimp-like creatures floating in the water, each barely the size of a pencil eraser. Baker slid a few inside a tiny vial. Later, she sent the specimens to a cave-biology expert, who immediately called her to plead for more. This was a species new to science.

"The discovery was almost by accident—we hadn't been looking for new species," says Baker. "It was beyond my wildest expectations to find something so interesting and bizarre."

These tiny white crustaceans, now called Model Cave amphipods or White Pine amphipods, live in cool, clear groundwater and have, to date, only been found in two pools in this single cave. The rare invertebrates feature long antennae, mandibles with tiny teeth, and a fan of spiny appendages like those of a lobster. Because the species has adapted to the darkness, they have no eyes or pigment.

Later that winter, Baker, Roberts, and other park staff visited the cave again to collect more amphipods, but when they arrived, the pool had dried

up. They realized that the creatures can travel through the mud, following water through a maze of cracks in the cave walls to places so deep no humans can follow. After five muddy, tiring, exasperating trips that winter, the pair finally found full pools with hundreds of amphipods. Using these specimens, cave experts in Illinois and Virginia officially established the new species in 2011. Now, a preserved amphipod is housed at the Smithsonian's National Museum of Natural History for future study.

Great Basin National Park was established to preserve a wide array of beautiful landscapes, including sagebrush desert, stands of ancient bristlecone pines, and craggy 13,000-foot peaks. With some 8,000 feet of vertical relief, it hosts a mind-boggling diversity of wildlife and some 800 species of plants, from cacti to aspen trees. The park's 46 limestone caves may seem lifeless by comparison, but wondrous creatures have emerged from these extreme environments. Because these niche ecosystems developed in isolation, unique, endemic species evolved inside them. Since 2002, biologists and Park Service staffers have discovered ten new species in the park's caves, including white and yellow millipedes and globular springtails—small invertebrates with spring-like mechanisms that allow them to leap away from predators.

After five trips, the pair finally found full pools with hundreds of amphipods.

© JIM BRANDENBURG/MINDEN PICTURES/NATIONAL GEOGRAPHIC

A Caver's Wonderland

Many of Great Basin's sensitive caverns, such as Model Cave, are closed to the public. But in Lehman Caves, visitors can see calcite stalactites, stalagmites, and hundreds of rare formations that look like dripping shields.

Although the park seems far from civilization, it does face potential threats, and so does the little amphipod. The Southern Nevada Water Authority has plans to pump groundwater from a nearby valley and build a pipeline to carry it to Las Vegas. The water agency secured approval from the Bureau of Land Management to build the pipeline in 2012, but some environmental groups are litigating the proposal. During the environmental-assessment process, NPCA organized a letter-writing campaign to the BLM and the Nevada State Engineer.

"No one knows exactly how much groundwater is in the aquifers that surround the national park—and no one knows how much pumping is too much," says Lynn Davis, manager of NPCA's Nevada field office.

In response to the pipeline plan, the Park Service is working with other government agencies to investigate how drilling might affect groundwater levels and vulnerable species like fish, frogs, and spring-snails. Park managers are concerned that the pumping could have long-term impacts not only on wildlife and plants but on the landscape and the air.

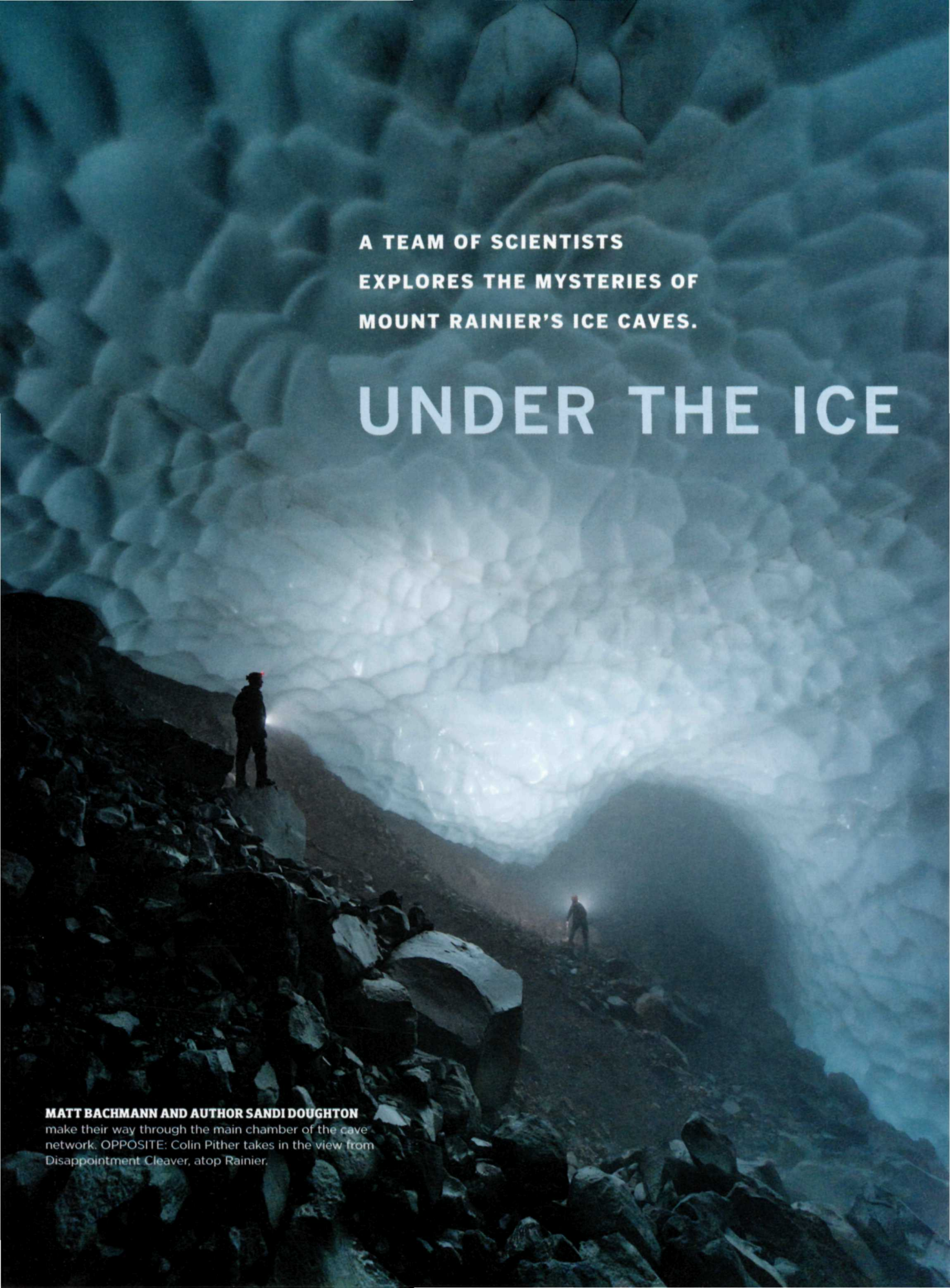
"If the pumping dries out the valleys, the vegetation will die," says Steven Mietz, superintendent of Great Basin National Park. "That could create air-quality impacts that could become a regional problem." Another concern is that if the water table drops, the dissolving process that formed the caves will stop—and the creatures inside will suffer.

It's not just the amphipods that are potentially at risk, but also animals that have yet to be discovered. "I'm certain there are other species, we just don't know how many," says Steve Taylor, a macroinvertebrate biologist at the University of Illinois at Urbana-Champaign who identified the amphipod and runs cave surveys in Great Basin. "It's still a frontier with a lot of unknowns." **NP**

KATE SIBER is a freelance writer and correspondent for *Outside* magazine based in Durango, Colorado. Her work has also appeared in *The Washington Post* and *National Geographic Traveler.*

A TEAM OF SCIENTISTS EXPLORES THE MYSTERIES OF MOUNT RAINIER'S ICE CAVES.

UNDER THE ICE



MATT BACHMANN AND AUTHOR SANDI DOUGHTON make their way through the main chamber of the cave network. OPPOSITE: Colin Pither takes in the view from Disappointment Cleaver, atop Rainier.

ABOVE THE CLOUDS

BILL LOKEY PLANTED HIS ICE AXE IN THE CRUMBLY slope and scanned the cavern with his headlamp.

Counting all the ups and downs, he had climbed more than 15,000 feet to get here, past yawning crevasses and over cliffs where a single misstep could send a rope team tumbling. His party was pummeled by a lightning storm so ferocious it stood one woman's hair on end. Gale-force winds threatened to shred their tents.

But now, the grin on Lokey's face said it was worth it.

A ceiling of ice arched 40 feet overhead, glistening as the light

STORY BY SANDI DOUGHTON
PHOTOGRAPHS BY FRANÇOIS-XAVIER DE RUYDTS

OPPOSITE: ZOË HARROLD pushes up the mountain despite exhaustion and altitude sickness. BELOW: Bill Lokey gazes at the summit from Camp Muir. He led the previous scientific expedition to the caves in the 1970s, and wore the same clothes and used the same gear from that trip.

danced across its scalloped surface. Steam hissed from volcanic vents called fumaroles, misting the air as it had more than four decades earlier when he first set foot in this otherworldly grotto.

Bigger than a ballroom, the chamber faded into darkness at either end.

"We called this the Coliseum," Lokey said, nodding in recognition—and awe.

In the early 1970s, this was the biggest room he and a group of fellow adventurers encountered as they mapped and explored one of the Pacific Northwest's least known natural wonders: the labyrinth of ice caves at the 14,411-foot-high summit of Mount Rainier.

The caves form as heat rises from the volcano's depths and melts the base of the ice cap that fills Rainier's twin craters. (See diagram, page 30.) More than 5,000 climbers trudge across those craters every year to tag the highest crest in the Cascade Mountains. Few have any inkling what lies beneath their feet.

The '70s-era map tallied more than a mile of passages in the main crater alone, with countless side channels left untracked. One chamber held a lake, which Lokey had named "Muriel" for his mother. He'd slithered headfirst down a chute dubbed the "Rabbit Hole," emerging to find an icicle as big around as an old-growth fir.

"To our knowledge, no comparable system... exists anywhere in the world," scientists wrote at the time—and no one has yet proved them wrong.

The adventure fired Lokey's imagination, and he's been itching to see the caves studied in more detail ever since. In the summer of 2014, he finally crossed paths with a team of experts who shared his passion.

Which explains why, at the age of 67, Lokey found himself back in the Coliseum.

With him was a biologist who studies microbes in environments so extreme they mimic other planets. A geologist joined the group to sample gases that could provide early warning if the volcano begins to stir. A professional photographer was on hand to improve on Lokey's grainy snapshots. A team of expert ice cavers came armed with mapping tools that didn't exist in the 1970s. And I tagged along to chronicle the adventure. The goal was to compile the most complete picture yet of the alien landscape and to tease out clues it might hold to the volcano's future and—perhaps—the origins of life.

Mount Rainier National Park officials welcomed the opportunity to learn more about a part of the mountain few rangers have ever visited. More accurate maps could help with search and rescue, says Roger Andrascik, the park's chief of natural and cultural resources. Monitoring changes in the caves over time could provide insights into the volcano's activity level and reveal more about the impacts of climate change as well.

Except for me, all the expedition members were experienced climbers. But that was no guarantee of success on a mountain that claims an average of four lives per year and foils nearly half those who attempt to reach its summit.

This would be Lokey's 40th trip to the top of the Northwest's iconic peak—and he very nearly didn't make it.

THE EARLIEST DESCRIPTION OF RAINIER'S summit caves comes from the first documented ascent. Gen. Hazard Stevens and Philemon Van Trump crested the crater late in the day on August 17, 1870. A bitter wind nearly swept them off the ridge. With nightfall approaching, the men were overjoyed to see steam jetting from the rocky rim. They took shelter in an opening carved under the snow by the heat and "passed a most miserable night, freezing on one side, and in a hot steam-sulphur bath on the other."

In 1954, Lou Whittaker and his twin brother, Jim, pioneers of Northwest mountaineering, ventured into the caves, but they turned back out of fear of toxic fumes. Lou returned in 1970 with a firefighter's breathing apparatus. He wormed through a small opening on the south side of the crater. "We called it threading the needle," he recalled.

For decades, the Whittakers led park visitors on tours of the Paradise ice caves, carved by water flowing under the Paradise glacier. Suffused with blue light, those caves vanished in the 1990s when the glacier melted back.

The summit caves were very different—dark and steamy with a hint of brimstone. But the air was breathable, Whittaker found.

During 1970s expeditions called Project Crater, Lokey and a cast of young mountaineers and scientists camped on the summit for weeks at a time. They used tape measures and compasses to size up passages, crunching the data with a slide rule. On the cave floors, they found dead birds, trash, and 19th-century climbing gear, proof that anything left on the summit would eventually work its way down. One cave contains the mangled wreckage of a Piper Cub airplane that crashed on the summit in 1990.

OPPOSITE: STEPHEN WARREN traverses a crevasse on Ingraham Glacier. ABOVE: Members of the team include (clockwise from top left) Bill Lokey, François-Xavier de Ruydts Tabby Cavendish, Matt Bachmann, John Punches, Zoë Harrold, Eddy Cartaya, and Colin Pither.

After the project, Lokey, who lives in Tacoma, built a career in emergency management, but his fascination with Rainier and its caves never diminished. In 1999, he guided a French volcanologist who paddled around Lake Muriel in an inflatable boat. But few scientists were eager to work in a place where blizzards strike year-round and the oxygen concentration is little more than half that at sea level.

The 2014 expedition team came equipped to deal with almost anything the mountain could throw at them. Those of us in Lokey's crew were loaded with winter camping gear, satellite phones, and food and fuel for more than a week. The cavers, led by U.S. Forest Service law enforcement agent Eddy Cartaya, lugged rescue equipment, gas monitors, and enough medical supplies to stock a field hospital.

When Lokey set off on a Monday morning in August, he carried 75 pounds on his back. At six-foot-two, with a bald pate and gear that dates to the Nixon Administration, he cut a conspicuous figure among young hikers sporting the latest parkas. Few of them could match Lokey's exuberance, though.

But by the time the 15-person team rendezvoused Monday afternoon at Camp Muir, a cluster of stone huts and outhouses two miles above sea level, Lokey and many others were exhausted by the seven-hour slog. A climbing ranger told them a storm was forecast to blow in Tuesday or Wednesday.

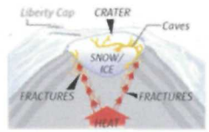
Our group had little choice but to take it slow. The plan was to summit early Wednesday—and hope the storm would hold off until then.

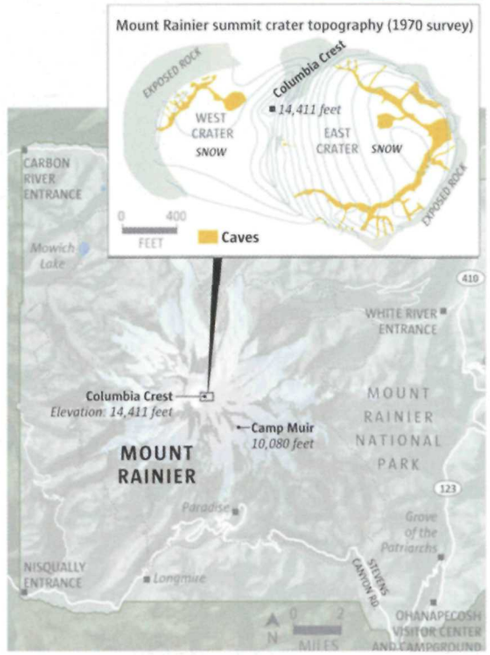
It didn't.

On Tuesday afternoon, soon after we pitched our tents

Mount Rainier's summit caves

Rainier's summit is a snow- and ice-filled crater. Heat from deep within the mountain travels up through fractures in the volcanic rock and melts the base of the ice cap, forming tunnels and caves.





at the head of a humpbacked ridge called Disappointment Cleaver, the sky darkened and began spitting pellets of snow.

Tent poles and metal stoves buzzed like angry bees. Zoë Harrold, a microbiologist from Montana State University, felt the electrically charged atmosphere lift her hair straight up.

With little shelter on the exposed ridge, we bolted for the lowest ground in sight. Huddled in a small saddle with the others, I shivered and cringed as lightning flashed through the clouds. Thunder echoed from all directions, and the wind blasted us with snow. It was an hour before the lightning abated enough that we could take refuge in our tents. The storm raged all night.

In the morning, the climbing route was obliterated by two feet of fresh snow. One member of the party picked up a forecast on his phone. More bad weather was on the way.

Traveling at a faster pace, Cartaya and his team had just reached the summit Tuesday when the storm boiled up.

"Big blue bolts were landing in the crater all around us," he told me later. "We grabbed our packs and ran for the nearest cave." Inside, water dripped from the ceiling. The fumaroles' exhalations warmed the air to 40 degrees, and Cartaya's meter registered no dangerous levels of hydrogen sulfide or other gases. The group made camp much as Stevens and Van Trump had done in 1870—but with the advantage of superior gear.

Nothing could keep the damp from seeping into their clothes, though, said Cartaya, who got hooked on ice caving when he moved to Bend, Oregon, to work for Deschutes National Forest. He and his team started mapping on Wednesday, marking way points and using laser range finders and inclinometers to measure distances and angles; special software will enable them to convert the data into three-dimensional images.

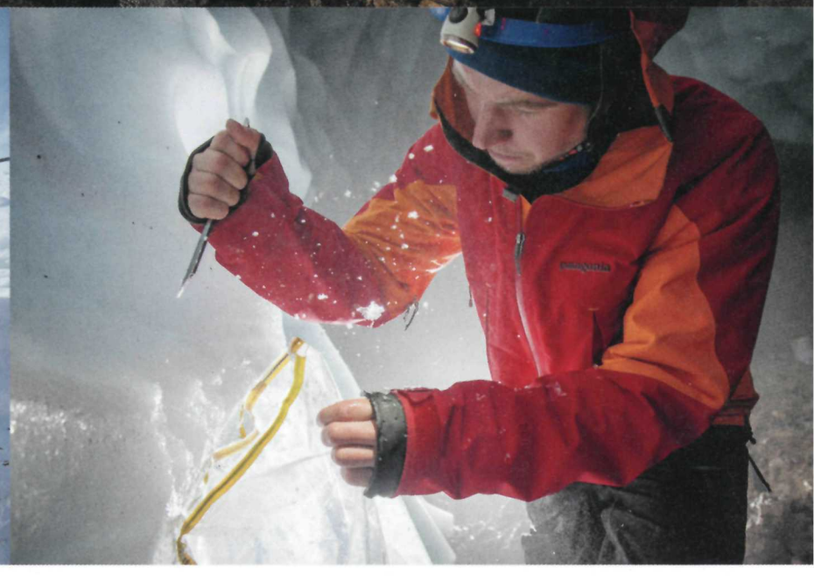
At the bottom of one vertiginous slope 200 feet below the surface, they discovered a lake that wasn't on previous maps. Cartaya called it Lake Adélie, because the azure water reminded him of the blue-eyed Adélie penguin.

But he could see right away that this expedition would just be a teaser. The cave network was much larger than the old maps reflected, with tantalizing passageways high overhead that would require ice-climbing gear to explore. Even as he jotted down dimensions, he started plotting a bigger expedition in 2015.

On Thursday, one of Cartaya's men woke with a rattle in his lungs. It was pulmonary edema, a life-threatening condition caused by elevation. The team cut their explorations short and descended that day—and the climber recovered fully. Meanwhile, Lokey and our group had retreated to Camp Muir to wait for better weather. At 2 a.m. Friday, we set out again. Thirteen hours later we reached the rim under sunny skies. Now it was the scientists' turn to go to work. Because the caves have been studied so little, it was mainly a mission of discovery.

"Guys, this is freaking awesome," United States Geological Survey (USGS) researcher Matt Bachmann exclaimed as he clamored through the labyrinth for the first time. He scooped up water samples from Lake Adélie for chemical analysis. "There might be something interesting, but we won't know until we look [at it back in the lab]," he said.

The fumaroles that sculpt the caves are of extreme interest, because they provide a window into the mountain's heart. Rainier's last major eruption was about a thousand years ago, but the volcano is far from dead. Its fumaroles, where temperatures reach a blistering 185° F, are evidence of a pool of magma miles underground.



ZOË HARROLD handles the day's water samples. TOP: Matt Bachmann retrieves a device that captures gas samples from a fumerole. BOTTOM RIGHT: Colin Pither collects ice from the cave walls for further analysis.

If that molten rock starts to migrate upward, the earliest indicator of a future eruption could be an increase in emissions of helium-3, a nonradioactive isotope enriched in the Earth's interior.

The USGS monitors helium at more accessible volcanoes but has no data from Rainier. Bachmann collected gas from seven fumaroles, using the end of his ice axe to nudge tiny copper tubes into the steaming vents. The results will establish a baseline against which to compare future measurements.

For microbiologist Zoë Harrold, the caves represent a once-in-a-lifetime chance to study an unexplored ecosystem. "What's really exciting is that we're basically starting from square one in an isolated, natural laboratory," she told me. Harrold specializes in extremophiles—microbes that flourish where most life withers. Rainier's summit caves present such a variety of withering conditions that Harrold had little doubt she would find some odd organisms.

She collected samples from the frigid lake and the superheated soil around fumaroles. She chipped chunks of ice from the cave walls, scraped up mineral deposits, and spooned mud into vials. What she learns about the microbial communities could help guide the search for extraterrestrial life and conditions that could harbor life elsewhere in the solar system. It could also yield insights into conditions on Earth when the first single-celled creatures arose. Weeks after the expedition, early results showed an abundance of genetic material in her samples, evidence of bacteria and other microorganisms. But it will require DNA sequencing to identify the players, and—if Harrold is lucky—six months or more to coax some of them to grow in her lab. Like Cartaya, she's making plans for a return trip.

Lokey reveled in the two days he spent on the summit helping the scientists and retracing his steps from 40 years ago. "It's just amazing to be here again," he told me before we headed down Sunday, seven days after our expedition started. But thrilled as he was to see the caves finally get serious attention, Lokey wasn't sure he would be back. This had been his toughest Rainier climb.

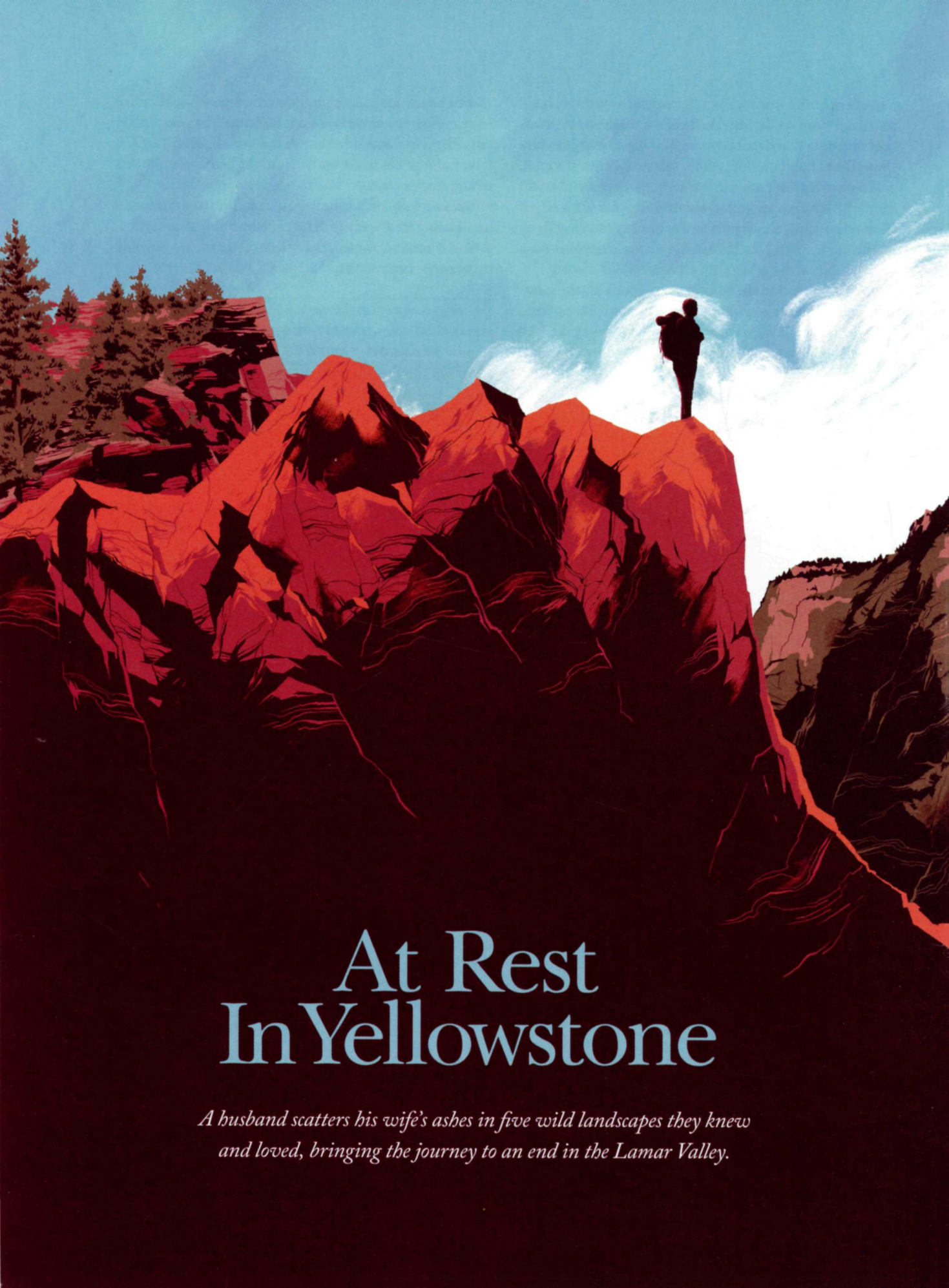
His knees ached, his shoulders throbbed, and his feet were rubbed raw. Worst of all, he feared he was simply too old. As he loaded his car in the Paradise parking lot, Lokey shook his head sadly. "I might be done with this mountain," he said.

Two weeks later, when the pain faded, he was immersed in planning for Cartaya's 2015 expedition.

But if he climbs again, Lokey said, someone else is going to carry the heavy stuff.

This article was a collaborative project between NPCA and *The Seattle Times*, where **SANDI DOUGHTON** works as a science reporter. **FRANÇOIS-XAVIER DE RUYDTS** is an adventure photographer who lives in Vancouver, British Columbia, in Canada. He has captured images in deep caves and atop high mountains, but photographing both at the same time was a first.

ZOË HARROLD takes water samples from a lake discovered by the team (opposite) and explores a narrow side passage (above).



At Rest In Yellowstone

A husband scatters his wife's ashes in five wild landscapes they knew and loved, bringing the journey to an end in the Lamar Valley.

In the spring of 2005, driving through the outskirts of Sudbury, Ontario, my wife Jane had turned to me with a serious look on her face. In the first such conversation we'd had in more than a decade, she rested her hand on my arm and asked if I remembered that if something ever happened to her, she wanted her ashes scattered in her favorite wild places. Five of them in all, from the red rock of southern Utah to the foothills of Wyoming's Absaroka Range; from the granite domes of central Idaho to the Beartooths of south-central Montana, to a certain high valley in northeast Yellowstone. Of course I remember, I told her.

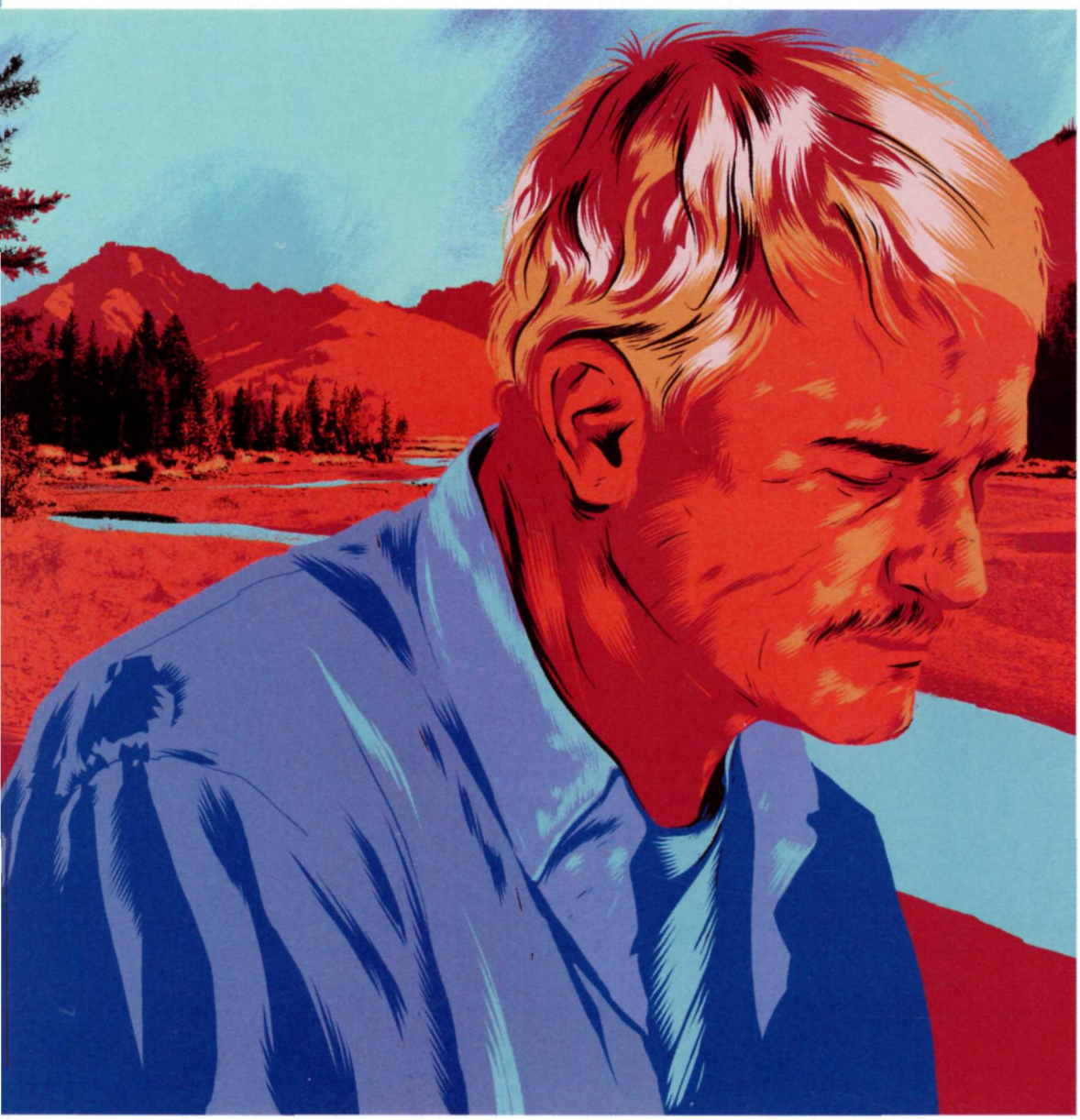
Ten days later she was gone, drowned in a tragic canoeing accident on the Kopka River.

In the weeks that followed, wrapped in an impossibly difficult fog of grief, I recall having only one thought about the future: That when neighbors were no longer bringing over covered dishes, when friends were no longer stopping by to mow my lawn and vacuum my house, no longer driving me to the mountains so I could sleep under the stars—probably sometime in early fall—I would make up the bed in the back of the old van we'd converted back in 1979, stock the tiny fridge, pick just the right music, and drive away. Beside me would be a jar, a beautiful jar, containing her ashes. One last time for the two of us, outward bound, into the West.

Those scattering journeys took five years to complete. At first, they broke my heart. Later they helped me piece it together again. But most notable of all is the fact that they brought me back to nature again, to wilderness; to the lilting beauty of unkempt places—places powerful enough to woo the hearts of anyone willing to put down the search for meaning for a little while and just float in the sensations of being alive.

There was the canyon country of southern Utah, which she'd come to know long before we met, confronting in that long-winded landscape an emotional struggle that had nearly killed her. There were the magnificent Sawtooth Mountains of Idaho, where we fell in love and later married. Also a little cabin in the woods of northern Wyoming. And finally, two places in greater Yellowstone: a high alpine lake in the northern Beartooth Mountains of

BY GARY FERGUSON * ILLUSTRATIONS BY MATT TAYLOR



Montana—a symbol of the place that, after much wandering, we came to call home; and the Lamar Valley, in the northeast corner of Yellowstone National Park.

That's where the fifth and final journey to scatter Jane's ashes brought me—a trek that involved walking more than 100 miles from my front door in Red Lodge, Montana, to the place where she had worked for seven years in one of the finest children's environmental education programs in the country. Having lived at the edge of the Lamar Valley for much of our 25 years together, it seemed superbly fitting that the wild, enthralling fabric of Yellowstone would turn out to be the place that helped me heal. The place that allowed me to lift my face to the sky, and begin again.

I was joined on this final journey by Tom Curwen of the *Los Angeles Times*, an old friend who wanted to document the story. At first I quietly rejected his idea to write about the hike, thinking it was best left a private affair. But over time it struck me that if anyone was capable of squeezing something useful from this poignant trek, if there could be found some small comfort for others in my labors, Tom would be the guy to pull it off. And so, along with *Times* photographer Brian Van Der Brug, who was fresh back from an assignment covering the war in Iraq, we hiked across the massive Absaroka-Beartooth Wilderness, finally entering the northeast corner of Yellowstone some 85 miles later, near the wind-tossed flank of Cutoff Mountain.

THE JOURNEY WAS WINDING down. Just one more night in the backcountry. With every passing hour, I found myself wishing it wasn't coming to an end. I wanted to keep going, keep walking through Yellowstone for another week or two or three, until the snows of autumn pushed me home. Tom asked if I had any worries about reaching this point, about reaching the end. But by then I'd had a strong glimpse of the life I knew Jane would want for me. I was at the point, I told him, where maybe it was less important to imagine my eyes and ears and nose and skin as portals for her to experience the world, as I did in northern Canada, than to see them as doorways for making my own way back among the living.

> Over the years, we left the roads with our packs on and waded knee-deep across rivers, ate dinner in the shade of lodgepole forests, slept with grizzlies. And as time passed, we came to revere this park.

The next morning, sore but undaunted, we started the gentle 13-mile walk down the Slough Creek Valley toward a developed campground in Yellowstone, where my friend John would meet us with food for the final dinner. The last day. The sun was full on, ringing in the sky, bringing shimmer and shine to the grasslands of Frenchy's Meadows—so named for a trapper in the late 1800s who set off on a fiery mission to eradicate the grizzly bears of the area, only to end up devoured by one. Though we saw no bears, mostly just elk and bison, the real stars of the show were the sandhill cranes, their wild, primitive chortle echoing up and down the valley off and on throughout the morning. At one point Tom and I were locked in a particularly intense conversation when we looked up to find a pair of sandhills not ten yards off the trail, plucking bugs from the branches of a sagebrush.

Besides loons (and in later years, wolves), the sound of the sandhill cranes, which every spring rang through the skies above our house, were for me the most appealing of all the songs of the wilderness. On several occasions I've been lucky enough to see their fabled mating dance, when a breeding pair comes face-to-face, each then launching into the air again and again with the most graceful hops and jumps, fluttering softly back to the ground. For the Greeks, and later the Romans, the dance of the cranes was said to be a celebration of the joy of life.

The walk was one of the finest in many years. The terrain offered less a hike than a sweet amble, one that matched perfectly the easy mood of Slough Creek, falling to the south slowly, flush with meander. Once again I found myself revisiting that Aboriginal idea of the dead being able to experience the world through the senses of the living. On that last day in Yellowstone, I was really hoping it was true. Because if it is, Jane would've wrapped herself around that trek like a long-lost friend. John was waiting for us about three miles out, eating his lunch on the trail; together the four of us made the final push to the campground. He'd gone to incredible lengths to give us a good welcome, and after a long plunge in Slough Creek, he served up beer and venison chili and salad and Dutch oven cornbread, and we ate until it seemed we'd never have to eat again. Late in the night, after we'd gone to bed, Martha arrived. Doug—my canoeing partner in the Thelon River country of Canada—would find us the next morning at 6:30, arriving in time to join us for the final trek to the ceremony site.

On first planning this trip, I'd intended to have the last scattering just west of the main Lamar Valley. But on that last morning, it just didn't feel right. I found myself wanting to be further upstream, within view of the old Buffalo Ranch, where Jane worked as a ranger for so many years. The place where, in the 1830s, the wonderfully literate trapper Osborne Russell laid down on his elbow beside the Lamar River, writing in his

journal how he wished he could remain there for the rest of his days. Changing the plan, though, meant that instead of walking three miles from the Slough Creek Campground, it would be closer to five. I told the group, feeling a bit sheepish. But no one seemed to mind.

It had been raining off and on all through the night, but by dawn, most of the storm had moved on, leaving only gray sky. We hit the trail before 7 a.m., strolling out of the campground and then up the highway, the air filled with the smells of Yellowstone: wheatgrass and patches of Douglas fir, sagebrush and bison dung and an occasional whiff of sulfur. On reaching the west end of the valley, we descended to the Lamar River, traded hiking boots for water sandals, then forged across the 62-foot-wide flow to a small delta on the south side. Once I settled on a spot for the ceremony, Doug pointed out that I'd chosen a place exactly halfway between a bald eagle nest and an osprey nest. Just up the valley was the Buffalo Ranch, so-named for having served as cowboy central in the early 1900s for the effort to bring wild bison back from the edge of extinction. It would later become a cluster of restored cabins, a cookhouse, and a classroom. And for parts of seven years, it was Jane's home away from home.

Many national parks allow visitors to scatter the ashes of loved ones, but some have certain restrictions, and many require a permit. Visit the park's website or contact the park directly to learn more.

She and I were off and on in Yellowstone for twenty-three years, and for the last eighteen, Yellowstone was just beyond our back door. The place soaked into us slowly, revealing some new weave in every season: on top of mountains, in the bottom of canyons, in the swells of these savannah hills. Over the years, we left the roads with our packs on and waded knee-deep across rivers, ate dinner in the shade of lodgepole forests, slept with grizzlies. And as time passed, we came to revere this park: the curious look of earth pushing out big pours of boiling water; the spring light on the sage fields of Lamar; the fluty ring of bugling elk in the fall. Even the smells were oddly filling—sometimes like black pepper and lemon peels; sometimes like eggs and toast.

ONCE AGAIN, ONE LAST TIME, THE CLOUDS began to give way, revealing patches of something close to autumn blue. We sat on the ground in a circle, at which point I invited my friends to share thoughts or memories of Jane. Doug, looking more sad than I'd ever seen him, told us that the Lamar Valley has always been a big part of the work he did as a biologist, that he'd never again set eyes on the place without thinking of her. Once everyone had a chance to speak, I told them that this place, more than any other in the American West, was where two of the things Jane loved best came together: wild nature, and the chance to share it with children. From here she set off with her young charges across the Lamar Valley, making long treks with them toward the Buffalo Plateau. Some days they fanned out into the Norris Geyser Basin to test pH in the thermal features, or headed for Mammoth to study the travertine terraces. On several occasions, she called me from a pay phone near the trailer she lived in at Tower Junction, telling me how she couldn't get inside because of a big bison blocking her way.

The whole of the Lamar Valley seemed at ease that day,

gently animated: Blue bunchgrass and junegrass and milk vetch trembled in a light breeze. Just up the valley, loose gatherings of bison were lowering their heads and pulling up mouthfuls of grass, chewing for a minute or two, then moving on.

I explained how, on this trip, it occurred to me that embracing Jane in the present meant letting go of her in the past. I thanked those friends for being the ones who early on carried me back to the wilderness—to the river and the tundra; for quaffing beer with me on summer nights under the stars; for hearing on countless occasions some new version of the nature of my sadness. As if on cue, the last of the gray clouds drifted apart to drench us with sun, washing the entire Lamar Valley with light. Just to the north, from somewhere high up on the steep, grassy slopes, a pair of coyotes called out with abandon, launching into a lively call-and-response of yips and howls.

When the time came to scatter the ashes, each of us was left to simply find our own appealing place in those vast, open meadows. For Doug, it was a spot near a big bison wallow, the bare ground layered with course brown hair. John, on the other hand, picked a patch of grass in perfect line of sight with the bald eagle's nest. I went toward the river, finding a low point on the delta. The following spring, the floods would come, carrying Jane's remains on to the Yellowstone, then the Missouri, then the Mississippi, then the Gulf of Mexico.

It was a brilliant finish. In part, I believe, because there's no place on earth like Yellowstone's Lamar Valley. It was here that the American bison was nursed back from the brink of extinction. And here too that, a century later, wolves would take their first steps back into the wild, after being absent for some seven decades. Both run free today, loping or howling or snoozing amidst eagles and ravens and grizzlies and otter and fox. It's in the Lamar, too, that every May, pronghorn fawns, as well as bison and elk calves, are born, the latter by the hundreds—babies rising on wobbly legs, soon to walk, then to run.

When she was working for the Park Service nature school, this was where Jane could be found most every morning, especially during the month of May—an eager woman surrounded by eager children. There she and her students would stand huddled against the chill, staring across these meadows, whispering and gasping and giggling. And every now and then, just looking at one another wide-eyed, feeling lucky. Knowing what a good thing it was to be smack in the middle such a wild place. Chosen ones, they were, witnessing for the whole world that unforgettable spill of new beginnings.

I went toward the river, finding a low point on the delta. The following spring, the floods would come, carrying Jane's remains on to the Yellowstone, then the Missouri, then the Mississippi, then the Gulf of Mexico.

GARY FERGUSON has written for a variety of publications, from *Vanity Fair* to *The Los Angeles Times*. He's the author of 22 books on science and nature, including two books focused on Yellowstone: *Walking Down the Wild* and *The Yellowstone Wolves: The First Year*. This essay was adapted from his new book, *The Carry Home*, published by Counterpoint Press.


SAVE TODAY.
TOUCHDOWNS TOMORROW.
See how much you could save on RV insurance.
GEICO for your RV
geico.com | 1-877-434-2678 | local office
Some discounts, coverages, payment plans and features are not available in all states or all GEICO companies. GEICO is a registered service mark of Government Employees Insurance Company, Washington, D.C. 20076; a Berkshire Hathaway Inc. subsidiary. GEICO Gecko image © 1999-2015. © 2015 GEICO

Following in the footsteps of an early adventurer, an intrepid group explores the surreal landscape at Craters of the Moon National Monument.

Astronauts on Planet Earth

Story and Photos by Craig Wolfrom

ZOOLOGIST AND STUDENT CONSERVATION ASSOCIATION VOLUNTEER, Allison Konkowski, explores one of Craters' lava tubes in search of suitable habitat for bats.

In 1920, explorer Robert Limbert found himself drawn to a stretch of south-central Idaho that had been shaped by volcanic eruptions thousands of years earlier. Limbert, his friend, W.L. Cole, and their Airedale Terrier camp dog, Teddy, ultimately crossed 80 miles of lava flows on a 17-day journey that Limbert wrote about in a 1924 *National Geographic* article. The influential story was widely read and played a key role in the creation of Craters of the Moon National Monument, which was established later the same year.

I first heard of Robert Limbert a year or two after I moved to Hailey, Idaho, during a National Public Radio driveway moment. The reporter explained that Limbert had built a historic lodge on the shores of the famed Redfish Lake near Stanley, Idaho, and also mentioned his ambitious trek. I had driven through Craters, as it is locally known, a few times after relocating from Bozeman, Montana, but never stopped to investigate.

Hearing about an adventurer who was so enamored of this uninhabited section of Earth that he spent weeks crossing it spurred my curiosity. So, over the next few years, I explored Craters, and each time, I was surprised by how much I enjoyed the experience.

The region is a land full of contradictions. Here, within just a few miles, the sagebrush steppe of the Great Basin Desert leads to Douglas fir and spruce forests, which, in turn, give way to the precipitous Rocky Mountains. Rivers that begin flowing from scree-studded lakes high above tree line carve their way down into mountain valleys before finally hiding deep within basalt-rimmed canyons. Tall and ancient granite batholiths rise out of parched and eroded desert hills. Yet, even amid such unique terrain, few

TED STOUT takes the high (and easier) road, hiking atop a *pahoehoe* flow. Flora and fauna that the group encountered included prickly phlox (top left) and various mosses and lichens.

sights can compare to the oddity that is Craters.

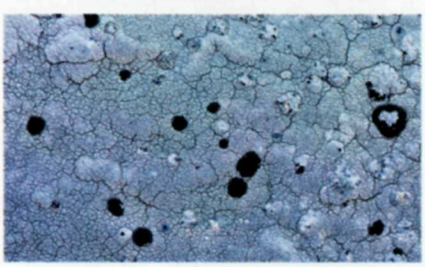
The landscape initially appears devoid of life, but as many adventurers who have explored this inland island of volcanic rock will testify, its bizarre personality gets more rewarding the deeper you probe its black surface. Craters encompasses everything from volcanic splatter cones, cinder cones, and lava bombs to sagebrush steppe and the steep foothills of the Pioneer Mountains. These surreal geologic formations are home to an amazing range of colorful flora and fauna, including the sage grouse, lava tube beetle, Craters of the Moon Buckwheat, and beautiful limber pine.

The volcanic eruptions that formed Craters began 15,000 years ago, and its most recent flows recast the landscape just 2,000 years ago. The hot spot underneath Yellowstone National Park is the same one that created Craters' three different lava fields, 60 lava flows, 25 cinder cones, and half-dozen eruptive fissures, long cracks where lava once flowed.

As one visitor wrote in a park guestbook, "Craters is the best national park that nobody knows about." It's true that many travelers ignore Craters—just 200,000 visitors passed through in 2013 compared with 3.18 million at neighboring Yellowstone National Park. But others, like me, love wandering around the lava formations, which can feel like playing on a weirdly beautiful, kinesthetic playground.

TRAVEL ESSENTIALS

Hiking in Craters requires a great deal of commitment and a significant amount of equipment. Though hiking trails exist in the northern section of the park, the vast majority of the park is unadulterated and pure backcountry. Because of the uneven nature of the terrain, ankle-high hiking boots, hiking staffs or poles, and well-balanced backpacks are necessary. First-aid kits are essential for remedying lacerations and blisters or stabilizing a victim until a rescue party arrives; bright, colorful clothing, space blankets, or a mirror can help rescue parties looking for a group on the lava. GPS and satellite phones are ideal to have as well. A lightweight backpacking stove and pots for quickly melting snow and ice quickly are critical, as is carrying freeze-dried food. The weather in Craters is typically extreme with high winds, hot days, cold nights, and fast-moving storms—dress appropriately. Finally, off-trail navigation skills are an absolute must in order to find known ice caves and kipukas. If a group has all these skills and pieces of gear, the rewards of crossing the lava are well worth the effort. It's also possible to see Craters and check out the fascinating volcanic formations without undertaking a massive hiking expedition. Parts of the park are easily accessible and there are kid-friendly hikes and an excellent Junior Ranger program.



Before long, I began contemplating a reenactment of Limbert's 1920 trek. It turns out I wasn't the only one harboring this lava-hiking dream. My search for fellow travelers quickly led me to Craters' interpretive director, Ted Stout. Word then slowly spread, and by last spring, we had assembled a group of six like-minded adventurers. Our plan: To walk 80 miles across the lava flows with Limbert's diary as our guide. Coincidentally, our 2014 expedition would mark the 50th anniversary of the Wilderness Act, which was first used to protect national park land in Craters and Petrified Forest National Parks back in 1970.

Our party met on a brisk and sunny April morning. Heading out into the unknown with Ted and me was Dan Buckley, Craters' superintendent and our trip leader; Michael Mancuso, a Boise-based botanist; Brian Bean, owner of Lava Lake Lamb Ranch; and Allison Konkowski, a zoologist and Student Conservation Association volunteer.

April is the prime month to backpack into the wilderness sections of the park, because cooler days and freezing nights keep snow and ice in the deepest of cracks and caves—the only source of water available. But the winter had been unusually mild, and the April snowpack was meager. So before our departure, we dropped off water caches on two remote dirt roads we knew we would pass.

Our packs were heavy when we unloaded them from the trucks at the Wood Road Kipuka Trailhead, just east of the small farming town of Minidoka, Idaho. Each backpack contained seven days' worth of freeze-dried food and at least four liters of water, which—we hoped—would get us through the first two days.

Even with the back-up water caches, we were nervous. As Brian sardonically explained, "Without water, your trip has ended and you may be ended, too." But

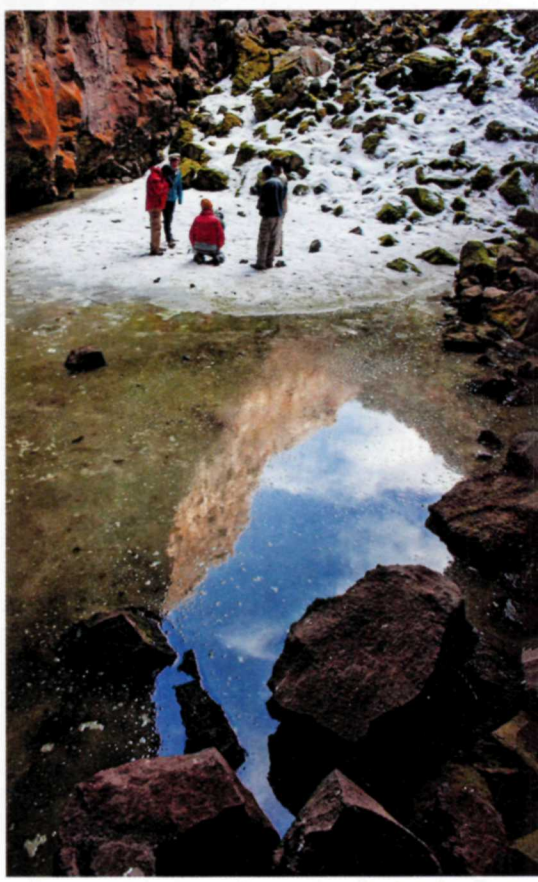
with a mix of bravado and optimism, we stepped away from civilization, with its soft and even soil, and ventured into the land of sharp and craggy volcanic rock.

Hiking over lava is akin to using a rickety, old stair-stepper that could break at any moment and send you careening to the ground. For every step forward, we were forced to take two steps to the side in order to avoid an intimidating rock, scraggly sagebrush, or a juniper tree. Even in stiff-soled boots, our feet became tender and bruised early on. The most seasoned backpackers in our group were humbled by the sections of *`a`a* (pronounced "ah-ah"), a sharp, uneven, and broken type of lava as difficult to cross as any alpine boulder or scree field. Though each of us wielded a sturdy hiking staff for balance, it took more than a few miles to adjust to the unsteady rhythm. We called it getting our "lava legs."

But before long, strength and muscle memory overtook uncertainty, and we were jumping over crevasses 4 feet wide and 20 feet deep. Sections of *pahoehoe*—rippling folds frozen in time as if they had cooled solid just hours ago—became so easy to hike on that they seemed like highways. Even the nastiest *`a`a* flows began to invoke a pleasurable mindfulness from the heightened level of concentration necessary to safely pass through their clutches.

Our eyes were constantly trained on one another. On our second day, Dan placed a foot on an unstable rock and stumbled, which reminded us all that a fall in the middle of the lava would be excruciatingly painful, and any rescue would be extremely difficult without a helicopter.

We had hoped to travel 10 to 12 miles each day to predetermined camp spots at the island-like peculiarities known as *kipukas*. (These older, eroded lava flows contain soil, grasses, and trees and are surrounded by newer, rockier lava flows.) *Kipukas* are the Four Seasons hotels of lava camping and offer soft and level ground for weary bodies. Our initial plans also had us camping near known ice caves where we could replenish our



OPPOSITE: TEAM BOTANIST Michael Mancuso leaps across a rift. ABOVE: On the third night, the team set up camp on one of the few spots with flat ground. BELOW: The group convenes inside King's Bowl, one of the deepest sections of the Great Rift.

water supply. But the difficult terrain kept us from ever reaching these prescribed daily destinations, so we were forced to bivouac on a section of relatively flat lava with little or no water, which resulted in uncomfortable camps and restless sleep.

Our trek roughly followed Limbert's route along the "Great Rift," a 60-mile line of deep cracks, which may be the longest in the contiguous United States. Encountering fissures that are 100 feet wide or 650 feet deep in places is a Tolkien experience; with an ear tilted toward their depths, it is easy to imagine the sounds of dwarfs and bubbling magma resonating toward the surface.

Like the fictional Mordor, Craters is also very dry—parts of the park see an average annual rainfall of less than 10 inches. Thanks to the aridity and the incessant high desert wind, the plants in this region are dwarfed, but their hues are magnificent. Flora as bright as molten-red lava stopped us in our tracks and quickly led everyone in our party to investigate what type of flower, lichen, fern, moss, or tree had found a shred of life-propagating chemistry from within the tiniest of cracks.

Michael, the expedition's botanist, was especially enamored of the mosses and lichens we encountered; on several occasions, he found species on a fist-sized piece of lava. "The flora may not be as jaw-dropping as walking through the giant redwoods or as Death Valley in a

ALISON KONKOWSKI reaches for a hold at the intersection of two lava tubes.

A quick estimate puts our group's cumulative tally at somewhere between 750,000 and a million steps, a figure that fills me with pride.

wet spring," he says, "but Craters of the Moon offers a stunning expression of beauty and tenacity in its own way."

We spotted a great horned owl, prairie falcons, and deer, and droppings revealed that sage grouse, antelope, and rabbits were nearby. On the fourth day, a well-nourished coyote with a bushy tail ran in front of us and disappeared into a chasm. Allison and I slowly followed the mysterious creature to the edge in hopes of capturing another sight and, perhaps, a photograph, but found that it had vanished into a maze of lava tubes as if entering a portal into the spirit world. Summiting a butte on day five, our party surprised a herd of elk. All the cows ran off and out of sight, but the young buck of the herd stayed and even came charging toward us, head bowed, before stopping a few hundred yards off.

On our sixth day, a member of our party was so hobbled by blistered feet and sore muscles that he and his hiking partner fell far behind on a three-hour hike. The rest of the group arrived at that night's camp and waited. And waited. As the hours passed, we grew increasingly concerned; we began searching for the two missing hikers by scanning the horizon from a nearby butte. During this uneasy stretch, it was hard to avoid thinking about a tragic incident that had occurred seven months earlier, when two women had perished on similar terrain after becoming lost while hiking off trail. Finally, eight hours after they had set out, the stragglers arrived, and all six of us were together as we set up our camp. We were immensely relieved, though a full day behind schedule and still 15 miles from our finish line, the Tree Molds Trailhead.

The seventh morning, we were unsure if we had the stamina to push through the final miles and finish our expedition on time, or if we'd find ourselves forced into yet another bivouac. In the end, our lava legs carried us through, and we reached the trailhead just as the sun was setting.

A quick estimate puts our group's cumulative tally at somewhere between 750,000 and a million steps, a figure that fills me with pride. This section of wilderness might not be as remote or vertical as the backcountry in better known national parks, but as Brian put it, "few are as wild."

On the last night, I walked a short distance away from camp, climbed to the top of a 30-foot-tall splatter cone, and sat down to take in the expansive view. I meditated in that spot for nearly an hour while the sun set. Cumulus clouds cast shadows across the lava flows, and the unremitting wind was the only sound. As I sat on that ancient cone, which once spewed hot

WINTER 2015
NationalParks

FREE INFO FOR YOUR NEXT ADVENTURE!

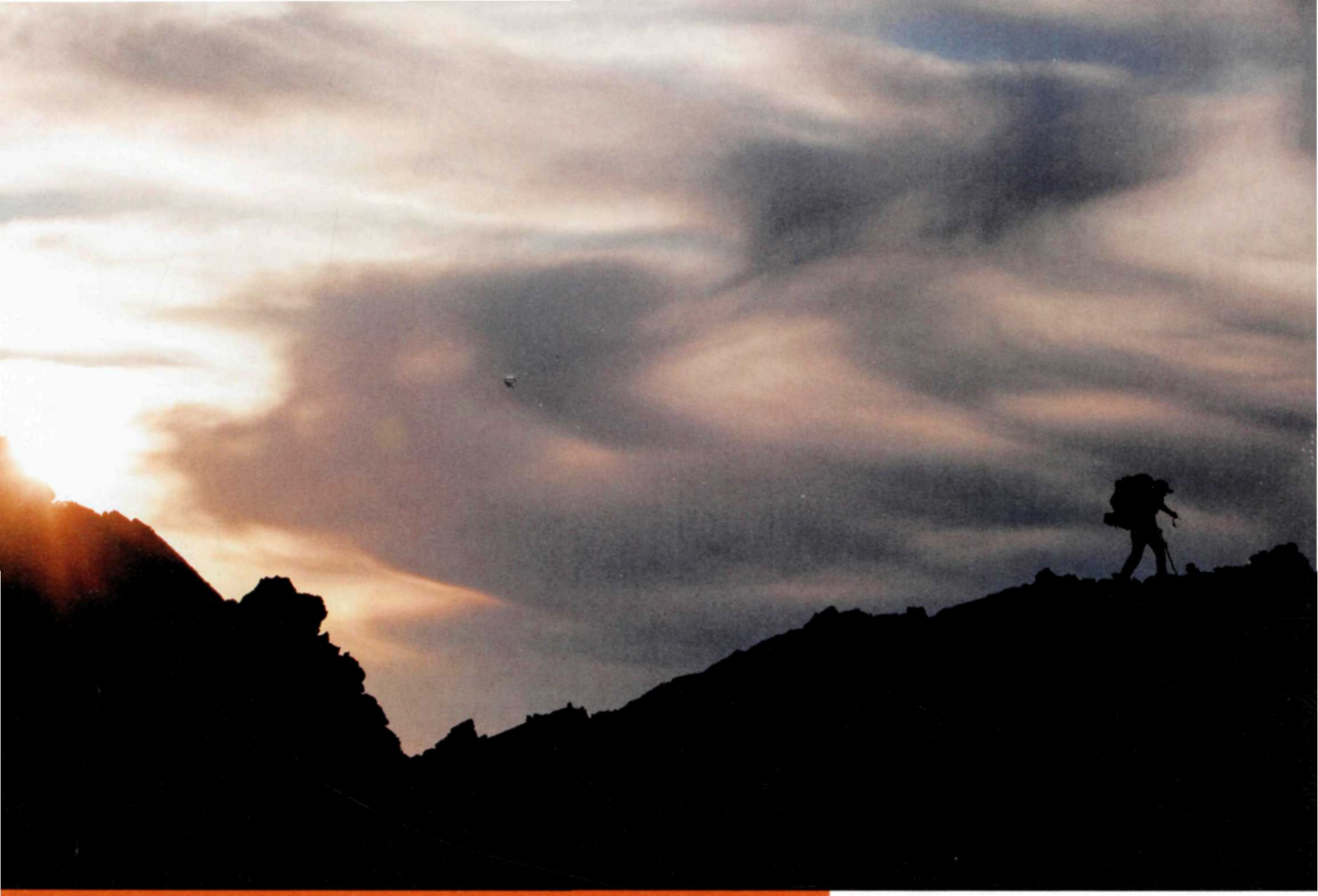
Learn more about the advertisers featured in *National Parks*. Simply fill out the attached card and return to us. We'll handle the rest! For faster service, fax toll-free to **888.847.6035** or visit **npca.org/magazine** and click "search advertisers."

Circle the number on the attached card that corresponds to your categories and advertisers of interest.

ADVERTISING SALES CONTACTS:

Natalie Matter DeSoto
717.580.8184 | natalie.desoto@theYGSgroup.com

Marshall Boomer
800.501.9571 x123 | marshall.boomer@theYGSgroup.com



HIKING ACROSS the treacherous *`a `a* lava at sunset.

molten lava, I had the kind of backcountry spiritual event I'd read about but had never experienced myself. Perhaps it was induced by hunger or fatigue, but regardless, my mind opened into a state of bliss, and I realized at that moment that the most important and powerful occasions in my life thus far had occurred with close friends and family on adventures such as this one. I absorbed the scene until the sun finally sank behind the distant horizon and the hues of twilight turned the distant peaks into silhouetted sawtooths. Then, trying not to let go of this feeling, I ambled back to my companions to eat the last of my freeze-dried lasagna under the blue glow of my headlamp.

Photographer and writer **CRAIG WOLFROM** lives in the mountains of south-central Idaho, where he is in constant pursuit of adventures on foot, skis, and bikes.

SIDE TRIP

WATERFALLS, SAND DUNES, AND STEAK SPICE

Craters may seem like it's on the far side of the moon, but it's closer to civilization than its name implies. Idaho Falls, a city that's often on the itinerary of visitors to Yellowstone and Grand Teton National Parks, is only 90 minutes away. Twin Falls, Idaho, about the same distance away, so offers Snake River's magnificent Shoshone Falls. At 212 feet high, the waterfall is 45 feet taller than Niagara Falls, as locals like to point out. St. Anthony Sand Dunes to the east and Bruneau Dunes State Park to the west are surreal wonders to behold and can each be found a couple of hours away. Also, just an hour due west of Craters lies the Wood River Valley, home to the world-famous resort town of Sun Valley. Here, Ernest Hemingway died and is buried; mountain bikers, skiers, and fly fishers delight; music festivals abound; and foodies rejoice. Finally, when heading to Craters, be sure to stop in at Pickle's Place in the nearby town of Arco (first town in the world to be lit by nuclear energy) and buy a bottle of John's Steak and Seasoning Spice for home barbecuing or French fries.

NEW State Quarters!

Honoring America's National Parks

Time is running out! Don't miss out on this 25-coin set of Uncirculated 2010-2014 National Park quarters! Prized by collectors, the issues were struck in limited quantities and WILL NEVER BE MINTED AGAIN! But now, with this special offer, you can own all 25 designs released from 2010-2014 in preferred Uncirculated condition, for just $9.95!

Get the 25-Coin Uncirculated Set!

Enjoy a special savings of 67% off the regular price of ~~$30.50~~ and get FREE shipping to your home. Plus, order now and you'll also receive a **FREE** Uncirculated 2010 Lincoln cent – first with the new Union Shield reverse.

You'll also receive our fully illustrated catalog, plus other fascinating selections from our Free Examination Coins-on-Approval Service, from which you may purchase any or none of the coins – return balance in 15 days – with option to cancel at any time. ***Order your 25-coin set today!***

Each minted for about ten weeks, then never again – order now!

To order, please mail coupon or visit us at www.LittletonCoin.com/specials

Special Offer for New Customers Only

☑ **YES!** Please send me the 25-Coin Set of Uncirculated 2010-Date America's National Park Quarters for ONLY $9.95 – regularly ~~$30.50~~, plus Free Shipping (limit 5 sets). Also send my **FREE** Uncirculated 2010 Union Shield Cent (one per customer, please).

Order Deadline: 12:00 Midnight, January 31, 2015

Method of payment:

❑ Check or Money Order payable to Littleton Coin Co.

❑ VISA ❑ MasterCard ❑ American Express ❑ Discover Network

Card No. _____ Exp. Date____/____

Name _____
Please print your complete name and address clearly

Address _____ Apt#_____

City_____ State_____ Zip _____

E-Mail _____

How Many Sets (limit 5): _____

Total Cost @ $9.95 per set: $ _____

Add Custom 2010-2021 America's National Park Quarters Display Folders and **SAVE 25%** at $2.95 each (regularly ~~$3.95~~): $ _____

Shipping & Handling: $ **FREE!**

Total Amount: $ _____

Please send coupon to:

Littleton Coin Company®
Dept. 3PF405
1309 Mt. Eustis Road
Littleton NH 03561-3737
America's Favorite Coin Source
TRUSTED SINCE 1945

FREE Gift!
when you order by deadline
Get an Uncirculated 2010 Lincoln Cent – first issue with new Union Shield reverse!

45-Day Money Back Guarantee of Satisfaction

SPECIAL SAVINGS!

Add Custom 2010-2021 National Park Quarters Display Folders & **SAVE 25%** at $2.95 each (regularly ~~$3.95~~)

Made in USA

This Necklace is NOT for Sale...

...It's yours for FREE*

No kidding. Only Stauer can give you 200 carats of genuine amethyst for ***NOTHING.***

You may think you understood the concept of "priceless" jewelry. For years, "priceless" meant "astronomically expensive." Owning "priceless" treasures was a rare privilege reserved for celebrities, billionaires, and royalty. The best most of us could do was dream. Until now...

Stauer smashes the luxury status quo with the release of our **FREE* 200-Carat *Lusso Amethyst Necklace***. That's right, we said **FREE**... as in "priceless." No charge.* ZERO dollars.* Call now and we'll send you this impressive helping of genuine amethyst (independently appraised at $295) for **FREE**. We cut the price 100% and you pay only $19.95, our charge for shipping, processing and insurance. There are no tricks or gimmicks. You aren't obligated to spend another dime or dollar with us... although we make it VERY hard to resist.

Why give away jewelry? We want your attention. Once you get a closer look at our rare gemstone treasures and vintage-inspired watches, and once you discover the guilt-free fun of getting "Luxury for Less," we're betting that you'll fall in love with Stauer. If not? Keep your **FREE *Lusso Amethyst Necklace*** anyway. No hard feelings.

A collection of purple perfection. Your ***Lusso Amethyst Necklace*** is a 200-carat symphony of smooth purple genuine gemstones. Each gemstone's shape and translucence ignites the velvety, violet hues. The polished amethysts are hand-set on double-knotted jeweler's thread, and the stunning 18" necklace (with 2" extender) secures with a gold-finished lobster clasp. Once you wear it, you'll see that it hangs with the same weight and elegance as similar strands that sell for hundreds more.

One more surprise... If we had our way, we'd send your ***Lusso Amethyst Necklace*** with no shipping charge. Unfortunately, the rising cost of gas and freight makes that impossible. But, to sweeten the deal, we'll include a **$20 Stauer Gift Coupon** with your **FREE** necklace. Amethyst is one of the world's most coveted gemstones and our supply is extremely limited. An offer this good will not last very long. Call to reserve your **FREE *Lusso Amethyst Necklace*** today and treat yourself (or someone you love) to a brilliant new definition of priceless luxury!

Lusso Amethyst Necklace (200 ctw) ~~$199~~**

Your Cost With Offer Code— **FREE***

***pay only shipping & processing of $19.95.**

You must use the offer code below to receive this special free necklace.

1-800-859-1680

ACCREDITED BUSINESS
Rating of A+

Offer Code LAN197-01
Please mention this code when you call.

Stauer® 14101 Southcross Drive W., Dept. LAN197-01, Burnsville, Minnesota 55337 www.stauer.com

Necklace enlarged to show luxurious detail.

200 ctw of genuine amethyst • Gold-finished spacers • 18"+2" length necklace

* This offer is valid in the United States (and Puerto Rico) except in TX, FL, CO, OK, RI, NH, WV, OR, SC, VA and ID. These state residents will be charged one cent ($.01) + shipping & processing for the item. Void where prohibited or restricted by law. Offer subject to state and local regulations. Not valid with any other offers and only while supplies last. This offer is limited to one item per shipping address. *** Free is only for customers who use the offer code versus the original Stauer.com price. † For more information concerning the appraisal, visit* ***http://www.stauer.com/appraisedvalues.asp***.

Smart Luxuries—Surprising Prices™

We made a difference.
You can, too.

"When Mike and I decided to create a living trust, national parks were high on our list, because they need to be preserved for future generations. NPCA will ensure that happens." — Kathy Grazioli, California

Join Kathy and Mike Grazioli and hundreds of other park lovers who have promised to protect our national treasures for future generations by including the National Parks Conservation Association in their will or trust. Create a meaningful legacy that will last beyond your lifetime.

Crissy Field, The Presidio, Golden Gate National Recreation Area, San Francisco, CA.
© Edward Caldwell

To receive our free brochure, *How To Make a Will That Works*, call toll-free **877.468.5775,** visit our web site, **www.npca.org/giftplanning,** or return the form below.

Please send your free brochure, *How To Make a Will That Works.*

_____ I would consider including NPCA in my estate plans.

_____ I have already included NPCA in my estate plans.

Name:

Address:

City/State: Zip Code:

Phone: Email:

NPCA Address: 777 6th St, NW, Suite 700, Washington, DC 20001

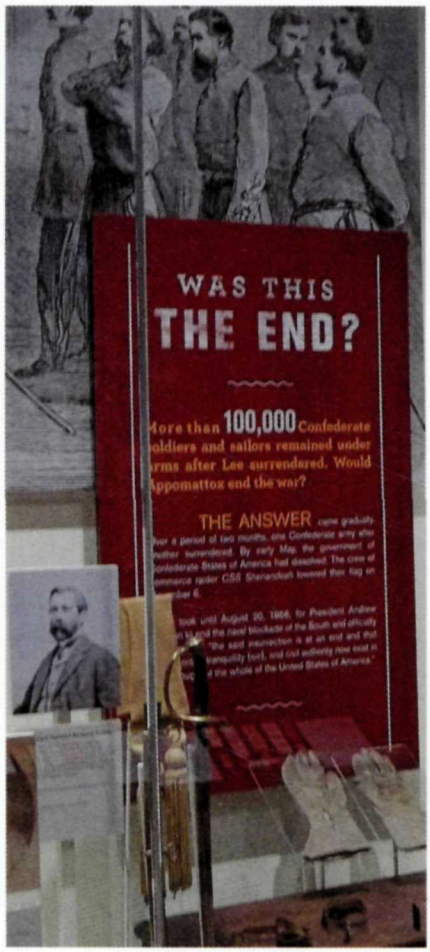
NATIONAL PARKS CONSERVATION ASSOCIATION

Chateau at the Oregon Caves
Courtesy of Christopher Willis, OCNM Media Specialist

CHATEAU AT THE OREGON CAVES

Cool Cave, Warm Hearth!

This national historic landmark spans a wooded ravine. Cave Creek flows from Oregon Caves National Monument's unusual marble caverns through the Chateau and on to the Pacific. Self-taught architect Gust Lium's rustic post and beam masterpiece features a grand staircase, massive lobby fireplace and 23 inviting guest rooms. Original Monterey furnishings and historic Kiser "Artographs" grace this birthplace of the "ViewMaster." Lodging, restaurants and gift gallery open May–November. For more information, visit *www.OregonCavesChateau.com*.



Civil War Display
Courtesy of Sam Craghead.

THE AMERICAN CIVIL WAR MUSEUM

Examining the War and Its Legacies

The fall of Richmond and the surrender at Appomattox were two critical milestones that helped bring the Civil War to a close. As the 150th anniversary of those events approaches, The American Civil War Museum's three locations in Richmond and Appomattox, Virginia are the perfect places to explore the end of America's bloodiest conflict.

The events of April 1865 will be commemorated in April 2015 through a wide range of tours, demonstrations, reenactments, lectures and hands-on activities. However, the story doesn't stop there. All three locations are open 362 days a year, and use dynamic exhibits, engaging educational programs and historical research to tell the stories of the War from multiple perspectives: Union and Confederate, enslaved and free African Americans, soldiers and civilians. To learn more, go to *www.acwm.org*.

Surratt House Museum
Courtesy of Surratt Museum, Clinton, MD/MNCPPC

SURRATT HOUSE MUSEUM

Have We Got a Story for You

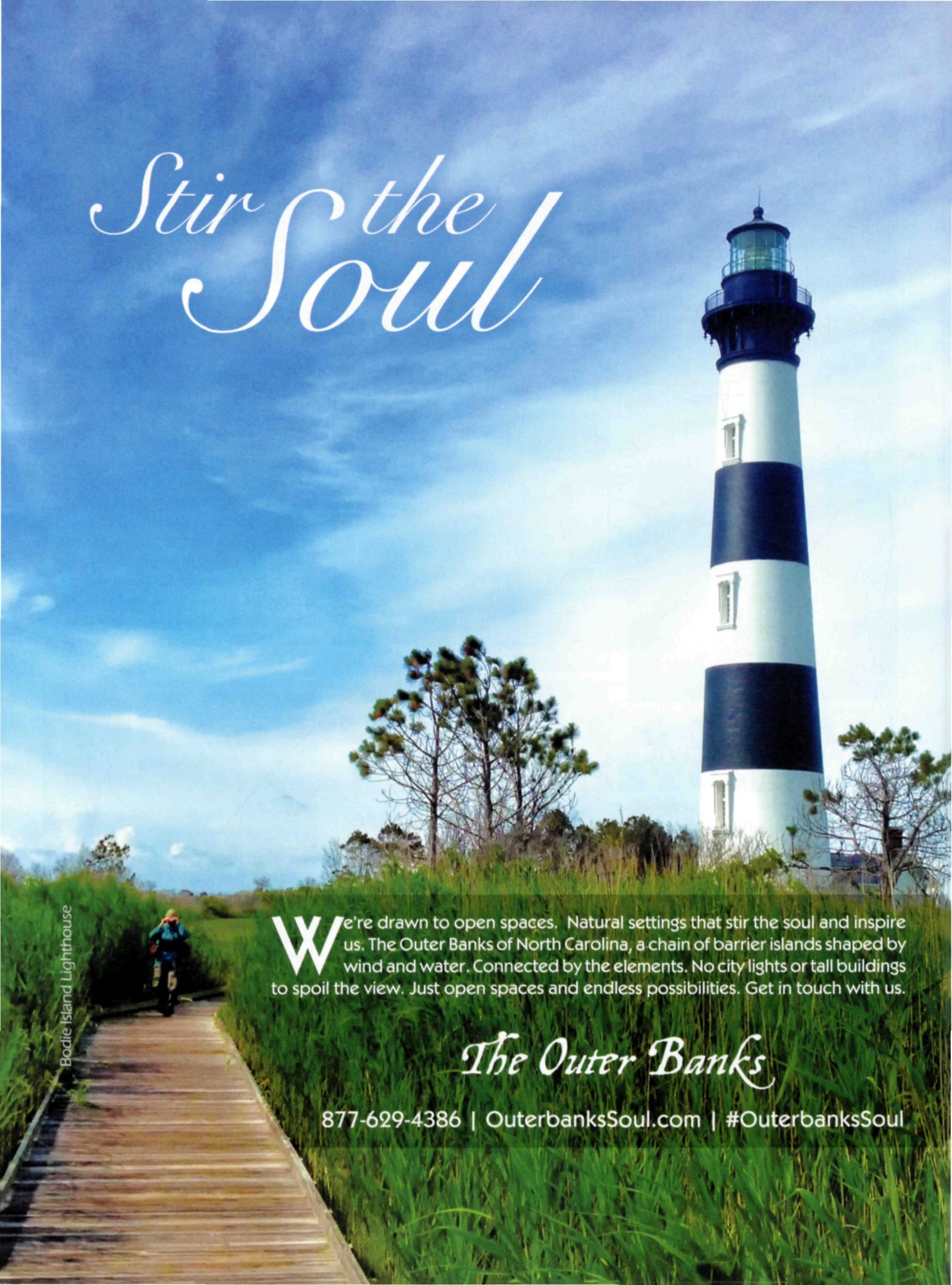
Built in 1852 as a middle-class farm house, tavern, public dining room and hotel, the historic Surratt House has national significance. After his attempt on President Lincoln's life, John Wilkes Booth stopped at the tavern to retrieve weapons and supplies he had hidden there. As a result, Mary Surratt, the widowed owner of the establishment, was tried and convicted of conspiracy to assassinate the President. Relive the tragic events of April 1865, as the nation is shattered by the assassination of its leader and the intense manhunt for his killer. Follow the military trial of the Booth conspirators and the first execution of a woman by the U.S. government. Visit *www.surrattmuseum.org* for tour details.

Front porch of the Sebastopol House Historic Site
Courtesy City of Seguin

SEBASTOPOL HOUSE HISTORIC SITE

A Concrete Paradigm of American Craftsmanship

Listed on the National Register of Historic Places, Sebastopol House, now a museum open to the public, is one of the best-preserved "limecrete" structures in America and rests in one of the oldest towns in Texas founded by Texas Rangers. Built in Greek Revival style by highly skilled slaves, it boasts a mystery dungeon and a secret water-cooling system. Also on exhibit is Wilson Pottery, rare artifacts from one of the first businesses in Texas owned by freed slaves. Open Thursday through Sunday, 9 a.m. to 4 p.m. To learn more, go to *www.visitseguin.com*.


Stir the Soul
Bodie Island Lighthouse
We're drawn to open spaces. Natural settings that stir the soul and inspire us. The Outer Banks of North Carolina, a chain of barrier islands shaped by wind and water. Connected by the elements. No city lights or tall buildings to spoil the view. Just open spaces and endless possibilities. Get in touch with us.
The Outer Banks
877-629-4386 | OuterbanksSoul.com | #OuterbanksSoul

MARY MCLEOD BETHUNE, an educator, activist, and national leader, was known in her day as "the first lady of the Negro race."

COURTESY OF THE STATE ARCHIVES OF FLORIDA

A First Lady

Mary McLeod Bethune, the child of former slaves, grew up to start a university and advise presidents.

ALL IT TOOK WAS A CHILD SNATCHING A BOOK from her hands. It happened in a flash, but the life of Mary McLeod Bethune, the daughter of former slaves, changed course the day a white girl insisted she couldn't read. Bethune, who was accompanying her mother as she delivered laundry, recognized in that moment how the ability to read and write separated white and black people, and her will to learn was ignited.

Bethune ultimately became a revered educator, activist, humanitarian, and leader who was known in her day as "the first lady of the Negro race." She was a larger-than-life figure whose every word, speech, and appearance was newsworthy to people across the country.

So it rankles some historians that young people can rattle off the names of her famous peers but don't know who Bethune is.

"For her to be who she was, coming from where she came from, and to have this courage—to me, it's just profound," says Joy Kinard, central district manager of National Capital Parks-East. "But you don't hear much about her anymore."

At Mary McLeod Bethune Council House in Washington, D.C., the Park Service is determined to change that. Located in the former headquarters of the National Council of Negro Women, an organization Bethune founded, the site is devoted to documenting the life and history of Bethune and African-American women.

Born Mary Jane McLeod, Bethune was the 15th of 17 children. She grew up on a farm in South Carolina and began working in the fields when she was 5. The only child in her family to be educated, she walked eight miles to school each day.

Bethune went on to found a girl's school in Daytona Beach, Florida. As the story goes, she started the school with $1.50 and just six students (including her son, Albert, from a short-lived marriage). The school grew to include a farm, high school, and nursing school and eventually became Bethune-Cookman University. The school's motto, a reflection of its founder's vision, appears throughout the campus to this day: "Enter to learn, depart to serve."

Bethune later became a national leader who served four presidents. A friend of Eleanor Roosevelt, she was a highly visible member of Franklin D. Roosevelt's administration. Roosevelt appointed her head of the Negro Division of the National

Youth Administration, making her the highest-ranking African-American woman in the federal government. She was also part of his Black Cabinet, an unofficial advisory council of prominent African Americans.

"Bethune was an iconic figure and a power broker with few equals," says Bettye Collier-Thomas, the founder and first director of the Mary McLeod Bethune Memorial Museum and the National Archives for Black Women's History. "From 1935 to her death in 1955, she was the single most important African-American woman people saw functioning at the national level."

During World War II, Bethune helped recruit African-American officers to the Women's Army Corps, and she was among those who urged President Harry S. Truman to integrate the U.S. military, which he ultimately did in 1948.

Bethune founded the National Council of Negro Women (NCNW) in 1935 and became the first president of the organization, which is still active. Her dream was to bring together women's groups to fight against racial discrimination as well as inadequate housing, health care, and employment opportunities.

"The great need for uniting the effort of our women kept weighing upon my mind."

"The great need for uniting the effort of our women kept weighing upon my mind," she wrote. "I could not free myself from the sense of loss, of wasted strength sustained by the national community through failure to harness the great power of women."

Bethune bought the rowhouse that became NCNW headquarters in 1943, using money from a Marshall Field's department store charitable fund. (Legendarily persuasive, she had travelled to Chicago seeking funding and walked out of the meeting with $10,000.) She lived in the house for six years before retiring and moving to Florida, where she died.

In 1966, the rowhouse was damaged in a fire and NCNW moved. The once grand neighborhood fell on hard times, and the house deteriorated.

That's the condition Collier-Thomas found it in, when she was hired as a consultant to NCNW in 1977. Curious about the dilapidated carriage house out back, Collier-Thomas ventured into the old structure and discovered boxes and boxes of documents. "I was overwhelmed," she says. "I had found a treasure trove of historic materials on African-American women."

As it turned out, Bethune had started a history committee long ago, in the hope that one day, the stories of African-American women would be central to the study of American history. Eventually, the boxes unearthed by Collier-Thomas grew into the National Archives for Black Women's History, a rare collection of photographs, objects, and personal and organizational papers from scores of historic figures. Now comprising 1,500 linear feet of material, the archives were housed in the restored carriage house until last February, when they were moved to the Museum Resource Center in Maryland. (The relocation angered some Bethune devotees, but Park Service staff believe the resources are better protected at the new facility; discussion about the future of the archives is ongoing.)

The rowhouse was restored, and the Park Service acquired the site in 1994. Today, the elegant building—in a revitalized neighborhood—is open year-round. Visitors can wander through the rooms where Bethune worked, hosted, slept, dreamed, and plotted; before leaving, they might pick up a copy of her last will and testament.

"I leave you love," Bethune wrote in the famous document. "I leave you hope... I leave you racial dignity... I leave you, finally, a responsibility to our young people." **NP**

RONA MARECH is associate editor of *National Parks* magazine.

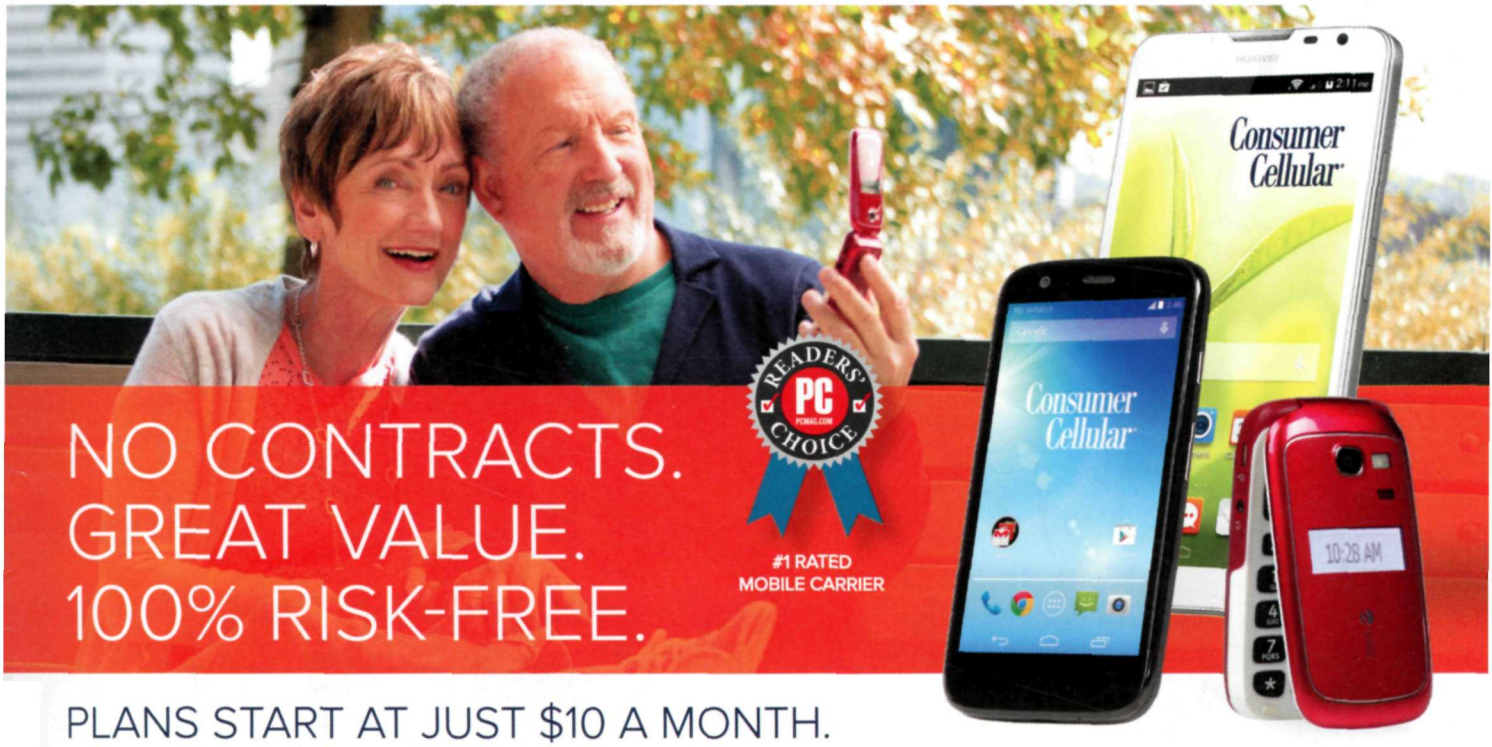
A HISTORIC CONCERT

When Marian Anderson was famously refused permission to sing to an integrated audience at Washington's DAR Constitution Hall in 1939, Bethune called the White House to intervene, setting the stage for Anderson's subsequent performance at the Lincoln Memorial before a crowd of 75,000.

CLIMBERS ON NISQUALLY GLACIER, Mount Rainier National Park, circa 1930.

Consumer Cellular®

AARP Real Possibilities | Member Advantages



NO CONTRACTS. GREAT VALUE. 100% RISK-FREE.

READERS' CHOICE PC PCMAG.COM

#1 RATED MOBILE CARRIER

PLANS START AT JUST $10 A MONTH.

NO CONTRACTS

Consumer Cellular plans don't require contracts—you can upgrade, change, or cancel your plan at any time, for any reason. With Consumer Cellular *you* are in control.

GREAT VALUE

Get a low, flat rate with dependable nationwide coverage. You choose the voice, text and data plans that best fit your needs with the freedom to change them as often as you like.

100% RISK-FREE GUARANTEE

If you're not satisfied within the first 30 days, 300 minutes, 300 texts or 300MB of data, whichever comes first, cancel and pay nothing, no questions asked.

FREE ACTIVATION

Activation is free for any new phone or SIM card—a $35 value. Consumer Cellular can even transfer your existing phone number for you at no extra cost.

FAMILY PLANS

Conveniently share minutes, messages and data with family for only $10 per month, per additional line.

A VARIETY OF PHONES

From simple phones featuring large, bright screens and big buttons, to top-of-the-line smartphones, we have options to fit any lifestyle. Or you can use any Consumer Cellular compatible phone, we'll even ship you a SIM card for free.

CALL CONSUMER CELLULAR AT

(888) 589-9654

OR VISIT US ONLINE AT

ConsumerCellular.com/NPCA

ALSO AVAILABLE AT

TARGET

sears®

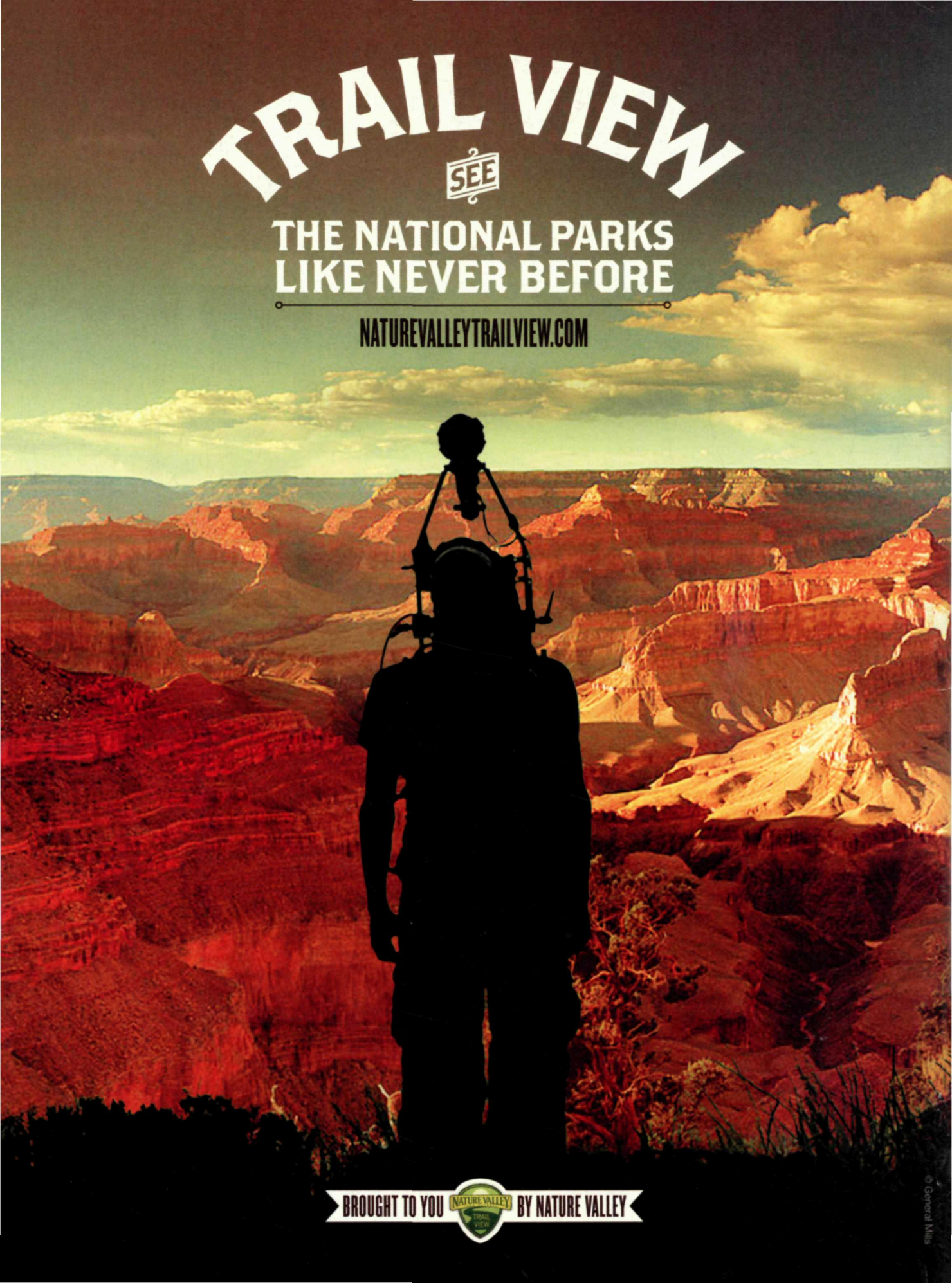
SHOWN ABOVE:
HUAWEI ASCEND MATE 2,
MOTOROLA MOTO G,
DORO PhoneEasy 618

NATIONAL PARKS CONSERVATION ASSOCIATION

WE'RE HELPING PROTECT OUR NATIONAL PARKS FOR FUTURE GENERATIONS

Our national parks are living, breathing monuments to our nation's history, culture, and landscape. They need our care and support to overcome the many dangers that threaten to destroy them forever. Join the National Parks Conservation Association, along with Consumer Cellular to ensure our national parks get that vital care and support...now and into the future.

Consumer Cellular will donate up to $5 to the NPCA when you sign up for e-billing.


TRAIL VIEW
SEE
THE NATIONAL PARKS
LIKE NEVER BEFORE
NATUREVALLEYTRAILVIEW.COM
BROUGHT TO YOU NATURE VALLEY BY NATURE VALLEY
© General Mills