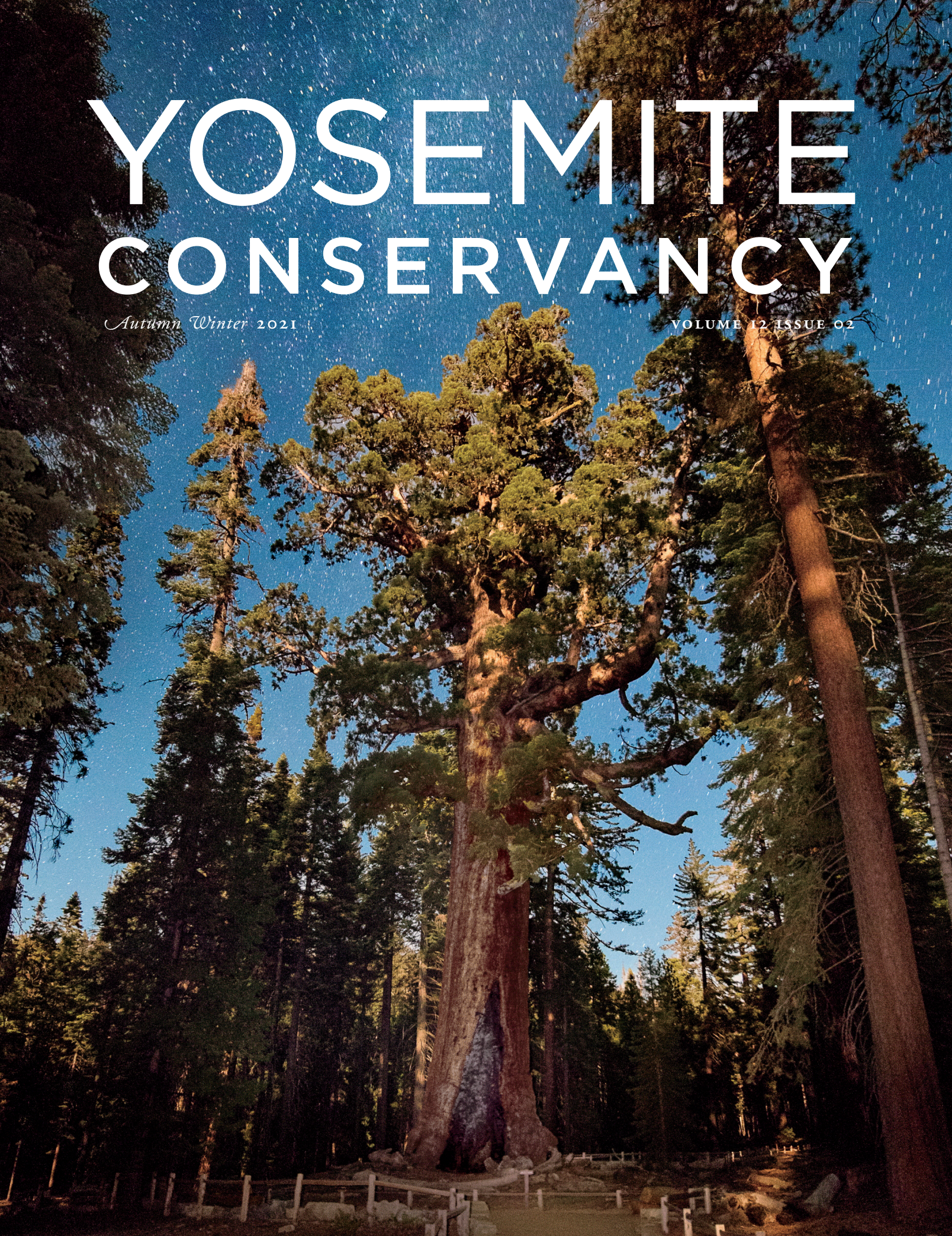
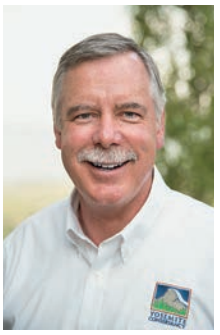


YOSEMITE CONSERVANCY

Autumn Winter 2021

VOLUME 12 ISSUE 02

Learning From Yosemite



BACK IN THE DAY, park rangers fed the bears near Curry Village on summer evenings to entertain park visitors. However well intentioned they were, we now know this practice conditioned bears to rely on human food and created decades of problems.

Even when I reported to Yosemite in the late 1980s as a young ranger, there were just three people on the park's resource management team, and two of them focused exclusively on bear issues. Now there are nearly 130 professional park staff who monitor the natural pulse of Yosemite through systematic research, much of it funded by our loyal park supporters.

We already know Yosemite is getting warmer, with less snow in winter. Wildfires have become more intense and frequent. The giant sequoia trees are stressed from a 10-year drought. But what are the park biologists learning, and how are they using their findings to protect and serve the park?

In recent years, our donor-funded research has yielded some notable good news. Remote cameras and radio collars assist in locating and tracking the endangered Sierra Nevada red fox and fishers. The newly acquired Ackerson Meadow will continue to provide important wildlife habitat, even while undergoing restoration during the next few years.

Data collection on Yosemite's wildlife biology, ecosystems and more — from these past projects and from the current initiatives detailed in this issue — is increasingly important for the long-term health of the park and the survival of various species. In these stories, you will learn more about climate change in Yosemite, fire management in the park then and now, and the importance of environmental education in our youth programs.

Of course, these three substantial topics also interact and overlap in significant ways, and thanks to your generosity, we are able to provide support to better understand and protect Yosemite holistically. Much like the natural relationship between bears and park rangers has been restored, we hope to ensure Yosemite's resilience into the future through careful research, traditional knowledge and expert restoration efforts — the responsible, if less exciting, kind of human interference.

Thank you so much for your support. It truly makes a difference in Yosemite.

Frank Dean

Frank Dean
PRESIDENT

COVER Sequoias under a starry Yosemite night. The preservation of this iconic species is possible thanks to your continued support.

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OUR MISSION *Yosemite Conservancy inspires people to support projects and programs that preserve Yosemite and enrich the visitor experience for all people.*

SAFEGUARDING SPECIES:

Protecting Yosemite's TREES

BY RYAN KELLY, IRENE VASQUEZ, KIMIORA WARD AND GARRETT DICKMAN

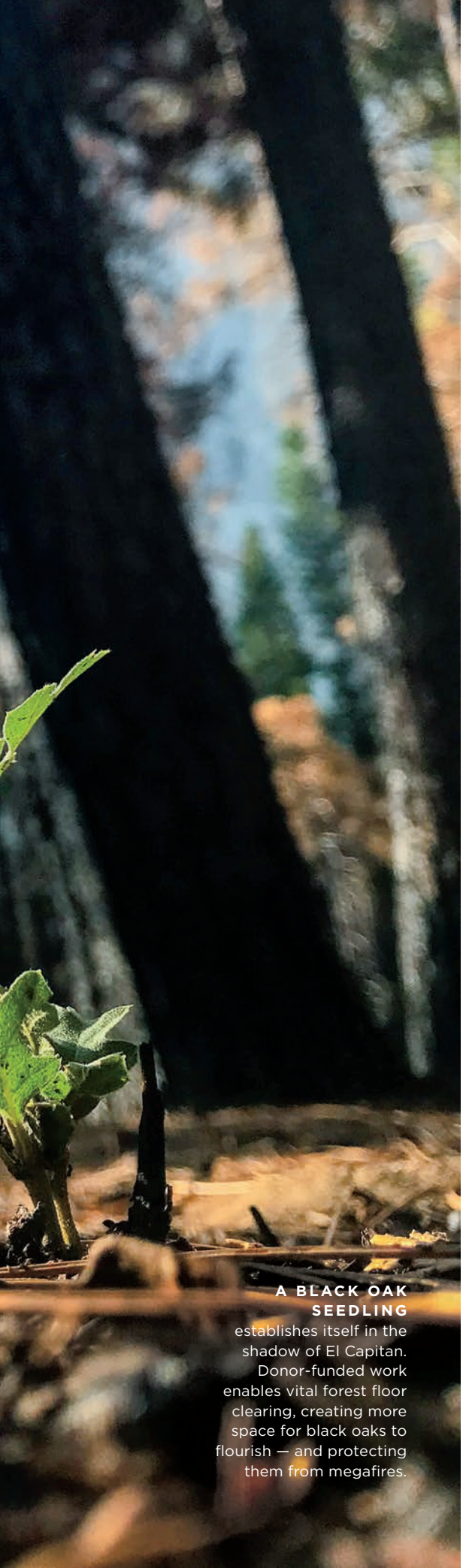
BLACK COTTONWOODS surrounding a black oak. Oak groves in Yosemite are an iconic scenic feature. Black oak are integral to Yosemite's seven associated tribes, who would grind acorns into flour and trade with neighboring tribes.

Picture Yosemite Valley from Glacier Point in the spring: Meadows and forests appear in miniature far below. The familiar line of the Merced River winds its way from Half Dome past El Capitan. Yosemite Falls rumbles across the valley. The meadows are green, the oaks are leafing out, and the pines — well, some of the pines aren't green at all; their needles are reddish-brown.

Climate change is affecting Yosemite's forests, and its effects are visible from the Valley floor to the alpine slopes of Mount Clark at 10,000 feet, where the needles on the windswept whitebark pines are browning. The main cause is certain, but it manifests in mysterious ways; several threats are responsible for the surprising changes to four key tree species in the park. Drought is a devastating culprit, but compounding challenges from pests, disease and catastrophic wildfire make it difficult to identify the direct causes of these trees' mortality.

Now, thanks to three important donor-supported projects, park scientists are taking action to better understand why trees are dying — and to determine strategies for saving Yosemite's beloved sugar pines, whitebark pines, black oaks, and giant sequoias.

Read on to learn how land managers are promoting the resilience of tree species in a rapidly changing climate.



A BLACK OAK SEEDLING establishes itself in the shadow of El Capitan. Donor-funded work enables vital forest floor clearing, creating more space for black oaks to flourish — and protecting them from megafires.

CALIFORNIA BLACK OAKS: TRIBAL STEWARDSHIP

Yosemite botanist Garrett Dickman points out that most plants in the Sierra Nevada have adapted to the presence of fire. However, after a century of fire suppression, today's wildfires are destructive beyond what this flora has adapted to withstand; they burn too hot and move too fast. Fire-adapted plant communities evolved with regular, low-intensity fires ignited both by lightning and indigenous peoples who served as Yosemite's original stewards.

Irene Vasquez, the park's cultural ecologist, is a Southern Sierra Miwuk and Piute tribal member. This year, she's leading the donor-supported California Black Oaks: Tribal Stewardship project, which is focused on removing fuel from the base of oaks to set the stage for the type of beneficial, low-intensity burns that were once an annual part of life in Yosemite Valley.

"Part of understanding [current] threats to natural and cultural resources is learning about traditions that once enhanced native plants for specific purposes like basketry, food, or other medicinal and spiritual purposes," Vasquez says.

In this case, the tradition is fire; regular burns maintained Yosemite Valley's beloved meadows and reduced the chance of high-severity fire by removing fuel from the ground each season.

MERCED GROVE:
SAVING GIANT SEQUOIAS

Oaks aren't the only tree species receiving attention through donor-supported projects in 2021. Yosemite's famous giant sequoia groves are also benefiting from extra care this year. Sequoias had survived thousands of years, but some have been gravely challenged the past five years; forest conditions, drought and fires are changing too fast. Around 50 giant sequoias across the range have died from a combination of drought and insect attacks, and last year, California lost 10%–14% of all giant sequoias in the Castle Fire — almost 10,000 trees.

This year, scientists are capturing beetles as they emerge from branches high above the ground to understand the role they play in sequoia mortality. Other teams are scaling the giant trees to measure water use and stress high in the canopy.

Thanks to donor support, we can protect the remaining big trees by studying how sequoias respond to drought and insect attack — as well as by landscape-level fuel reduction and prescribed fires.

PROTECTING SIERRA NEVADA PINES

The venerable sugar pine is another of Yosemite's famous — and struggling — tree species, and it, too, is the focus of a 2021 Conservancy research grant. Sugar pines are cherished for their beauty and ecological services, including providing cover and nesting sites for wildlife. Together with whitebark pines and western white pines, they make up a family of species referred to simply as white pines. These five-needle pines are imperiled by the introduced white pine blister rust, a deadly pathogen, and the effects of a changing climate — from drought to fire to mountain pine beetles, which appear to attack more frequently as winters grow milder. Lower-elevation sugar pines and western white pines have suffered up to 80% mortality in recent years, and the worst impacts have been observed in large, cone-bearing trees — the most important specimens for the successful regeneration of the species.

With support from donors such as you, Dr. Patricia Maloney from UC Davis is collecting cones from eight populations of lower-elevation sugar pine in Yosemite this year. These cones will contribute to important gene-conservation efforts, including nursery trials to screen for blister-rust resistance. If genetic resistance to blister-rust disease is detected in these Yosemite populations, park scientists can identify and target resistant source trees for future cone collections. This way, eventual restoration plantings can emphasize current threats and create resilience in the next generation of sugar pines.

This approach to targeted reforestation is known as "assisted migration" and is being considered by researchers working to address climate change across the country — but it's not new. Collecting and replanting native seeds has long been a practice of the Indigenous people who were the original stewards of these lands.

GIANT SEQUOIAS in Merced Grove rising from a snow-covered forest floor. Yosemite's giant sequoias are experiencing significant threats, and they are susceptible to beetle infestations and death due to drought.

WHITEBARK PINES

Yosemite's whitebark pines serve as a unique example in efforts to protect treasured trees from the effects of our changing climate. While the whitebark pine is proposed for listing under the Endangered Species Act and is severely declining throughout most of its range, the central and southern Sierra Nevada is considered a refuge for the species.

California whitebark populations are genetically distinct and appear to be healthier than those elsewhere, with much lower rates of blister-rust infection and mountain pine beetle attack. These populations at the southern edge of the pines' range may represent an important source of genetic variation for the species as a whole. Because they are adapted to drier, more Mediterranean climates, they could serve as an important source of gene flow to northern populations as the climate warms.

Ecosystems that are resilient to climate change are known as *refugia*. While not immune to the pressures of climate change, these areas provide time and space for research and regeneration. Whitebark pine stands in Yosemite, Sequoia and Kings Canyon national parks offer this combination of distinct ecology, precious genetics and reduced stressors. With funding from Yosemite Conservancy, the National Park Service is developing a management strategy for whitebark pines in all three parks. The NPS plan will align with the recent California-wide Interagency Conservation Strategy for Whitebark Pine, as well as a national restoration policy that is currently in development. These strategic plans will identify priority stands for the long-term protection of the species. They'll also ensure proposed conservation actions align with Wilderness Act policy, since the majority of whitebark pine stands in all three parks occur in protected Wilderness.

Park leaders always face challenges and trade-offs in their management of natural and cultural resources. In the face of a rapidly changing climate, resource managers are documenting the increasing impacts of drought, pests and megafire on our forests in every season. With your support, these three projects will help scientists better understand and respond to the unprecedented challenges facing four beloved Yosemite species through fuel reduction, prescribed burns, seed collection and genetic research. Your generosity is helping protect precious populations of black oak, sequoia, sugar pine and whitebark pine trees. ■

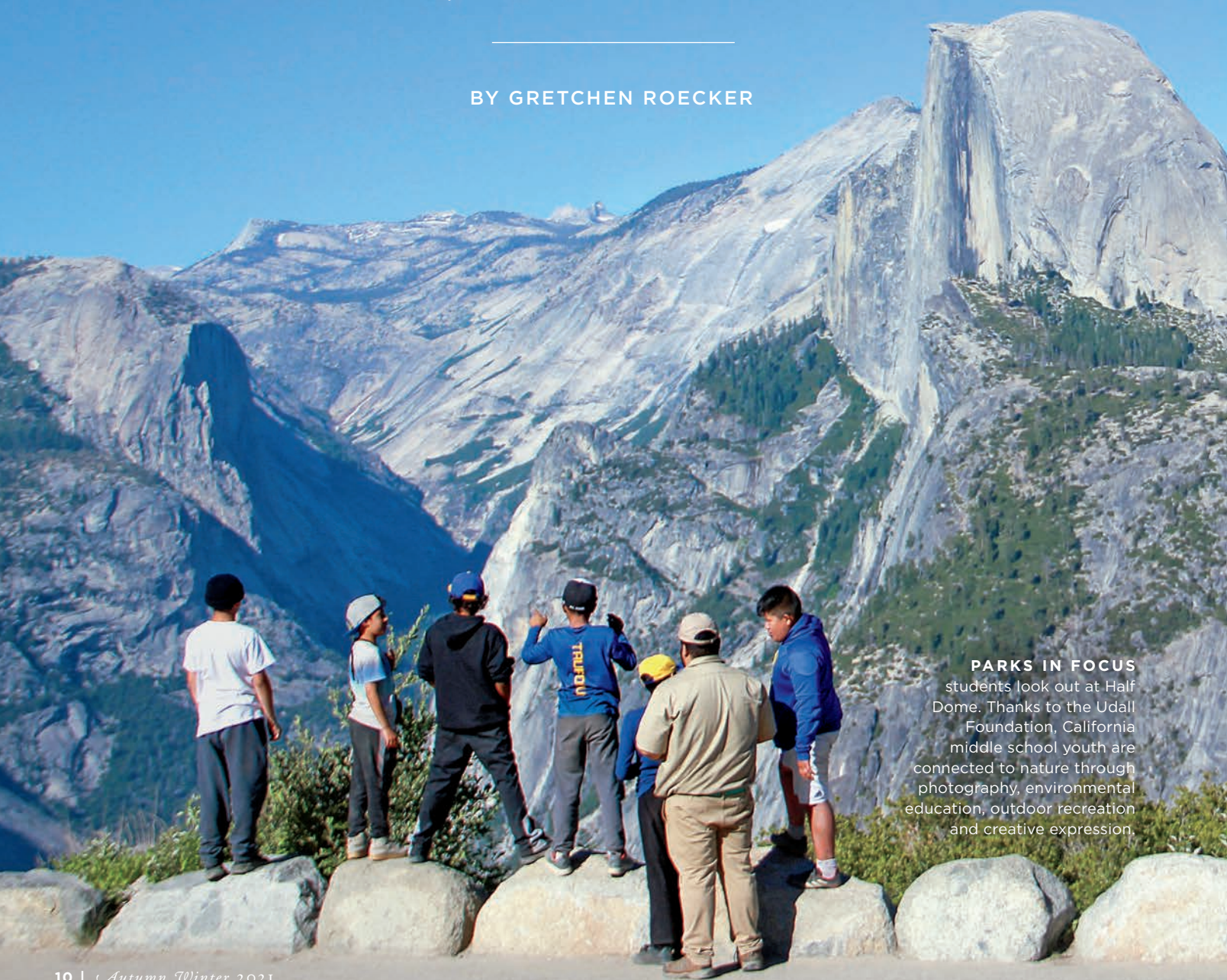
This donor-funded work is one critical element of the collective response of adapting to and mitigating the worst effects of climate change on our public lands.

MEET YOUR TEACHER:

YOSEMITE

How do our youth programs integrate science education and environmental justice? We hear from a number of participants about how they have learned from their environment.

BY GRETCHEN ROECKER



PARKS IN FOCUS students look out at Half Dome. Thanks to the Udall Foundation, California middle school youth are connected to nature through photography, environmental education, outdoor recreation and creative expression.

In July 2021, Selena, a rising California high school senior and lifelong nature-lover, set off on her first backpacking trip. Her companions: 11 fellow participants in the Adventure Risk Challenge (ARC) Yosemite summer course, four instructors, and acres of mountains and forests. As a competitive runner, Selena was up for the physical demands of the trek from Tamarack Creek to Tenaya Lake. But she was anxious. She'd never hiked or camped before, and now she had to sleep outside and navigate trails with people she'd just met.

Before long, Selena's stress gave way to an appreciation for her surroundings, for teamwork and for experiential education. She saw waterfalls for the first time ("mind-blowing!"), learned to "Leave No Trace," and practiced patience and collaboration. And Selena, a budding biologist, got to delve into a subject she adores: science. With a field guide in hand, she examined ecosystems up close and identified plants and animals along the trail.

The backdrop to Selena's trip was a hot summer after a dry winter. Much of California was facing extreme drought, and wildfires had already scorched hundreds of acres across the state. Like anyone spending time in Yosemite, Selena and her peers witnessed impacts of climate change firsthand: dying trees, hazy skies, dwindling alpine snow.

In the world of public lands, we often talk about shaping the next generation of nature stewards and the importance of ensuring those stewards represent the diversity of the nation. Amid a cascade of environmental crises, that concept feels ever more pressing. The youth programs our donors support reflect the complexity and urgency of the moment.

Participants study ecology in a rapidly changing landscape; they explore environmental justice in conversations about park history and access. And at their core, Conservancy-funded programs encourage students — from kindergarten Junior Rangers to ARC's high schoolers — to be curious, creative scholars of the natural world.

In an 18-month stretch where education of all kinds has been disrupted, at best, ARC and other programs have been able to keep students engaged in nature-based learning. For Selena, being able to connect the pages of her field guide to the living Yosemite Wilderness in real time was a vastly different experience from being in a classroom or lab. She could look at a scientific sketch of a sequoia one moment and gaze up at a giant tree's towering crown the next.

> "We invite our students to look deeply, notice details and focus on the environment around them."
>
> **Mel Hoffman**
> ARC PROGRAM DIRECTOR

ARC PARTICIPANTS Angel Escoto, Emily Zaragosa, and Selena Lopez learn to read a topographical map with Jesus Alejandra atop El Capitan. PHOTOS: © COURTESY OF UDALL FOUNDATION

Science has always been a pillar of ARC's model, along with literacy and leadership training. Over time, the program's focus has shifted from lecture- and research-based activities to place-based learning, rooted in observation.

"We invite our students to look deeply, notice details and focus on the environment around them," says ARC Program Director Mel Hoffman.

On an ARC course, students such as Selena learn to slow down and take in their surroundings. They identify species and document their findings, analyze data to assess tree and water health, and read about and debate environmental issues. ARC's literacy component is anchored in environmental learning, too: Students use a plant, animal or habitat they've observed during the course as the basis for metaphorical poems.

Encouraging students to think deeply about their surroundings sparks dialogue on environmental justice, too, Hoffman says. Many ARC participants are from immigrant families living below the poverty line — and often not represented in popular portrayals of "outdoorsy" people. Through "community conversations," students talk about who belongs in the outdoors and who has the ability to consider being an "outdoors person" as part of their identity.

They also explore the park's complex and sometimes cruel human history. ARC leaders incorporate Indigenous land acknowledgements at the beginning of expeditions. Selena's cohort visited Wahhoga, the site of the Valley's last Native village and a future cultural center.

Like ARC, Parks in Focus, a Udall Foundation program long supported by Conservancy donors, takes advantage of Yosemite as an outdoor educational hub. The crux of the program is a five-day camping trip, during which the middle school participants use digital cameras to learn about the environment.

"Photography is a starting point," says Bret Muter, Udall Foundation's deputy director of education

AS THE SUN SETS on Tuolumne Meadows, Parks in Focus students find the best light at golden hour. Participants hone their photography skills in iconic settings throughout the park, and enjoy a photography walk with staff from the Ansel Adams Gallery.

PHOTO: © COURTESY OF UDALL FOUNDATION.

"Parks in Focus emphasizes talking about public lands as places for all."

Bret Muter
UDALL FOUNDATION

programs. "It allows us to integrate other elements of learning."

Parks in Focus lessons start with basic photography concepts, such as how to select a subject or take a macro image. Then, students use their new camera skills as a tool for scientific curiosity. They might go on a scavenger hunt to photograph different plants and animals. As they zoom in on bark patterns, they can wonder at a tree trunk's layers. Focusing on a butterfly as it floats over milkweed becomes an opportunity to learn about pollination.

The kids may learn about the relationship between snowpack and water; get a basic introduction to how climate change is affecting the park; and explore human stories, including those of displaced Indigenous communities, as an essential part of understanding Yosemite's past, present and future.

Not everyone who participates in and learns from Parks in Focus is an adolescent. Eric Ruiz went to the Boys & Girls Clubs of the Peninsula — a long time partner of Parks in Focus — when he was growing up; now, he's the enrichment manager at the clubs' East Palo Alto location, a role that includes chaperoning Parks in Focus trips for students from historically marginalized Bay Area communities. So far, he's been to Yosemite 11 times with Parks in Focus. During the past decade, Ruiz says, Parks in Focus has helped him fall in love with the park and with nature. He's seen the program have that same effect on students.

"Normally, when our students hear about Yosemite, they never knew this park existed …" even though they live just a few hours away, Ruiz says. By partnering with the Boys & Girls Clubs, Parks in Focus gives his students an experience they may not otherwise have.

"Parks in Focus emphasizes talking about public lands as places for all," Muter says. For him, a deep commitment to showing students that Yosemite is for them, as a place to recreate and learn, is rooted in something a student said on a Parks in Focus trip years ago: Kids like us don't go to places like this.

Parks in Focus and other donor-funded programs help ensure young people who are typically underrepresented in places such as Yosemite not only get to go to the park, but also get to explore biology and geology, build outdoor skills they can use on their next hike or camping trip, and maybe even set their sights on careers in conservation, science or nature photography.

Youth program alumni might gain a penchant for birding or botany, a

THANKS TO GENEROUS SUPPORT from Yosemite Conservancy, participants keep their digital cameras as an incentive to continue their photographic explorations. Images all taken by young photographers, from L–R, clockwise: A fawn stands in the shallows of a river and a big tree from a unique perspective, taken by Monica, age 12; a purple sky lupine taken with a macro lens, by Sophia, age 11, Boys and Girls Clubs of the Peninsula; a ladybug on small white flowers, by Emely, age 10. PHOTOS: © COURTESY OF UDALL FOUNDATION.

"The future of our planet requires that young people take an active interest in the choices we're making that affect it."

Mel Hoffman
ARC PROGRAM DIRECTOR

new interest in analyzing hydrological data, or a deeper understanding of how past and present injustices affect people's relationships to land. Results from ARC's post-trip surveys show that 90% of students say nature and the environment are important to them.

Ruiz, who teaches a popular photography program at the Boys & Girls Clubs, says former Parks in Focus participants often tell him they're going on hikes, checking out local parks and continuing to explore nature with their cameras. At least one declared a goal to become a Yosemite ranger one day.

And, as Selena can attest, ARC and other programs not only emphasize environmental education, but also instill skills — perseverance, collaboration, curiosity, leadership — that are needed by the next generation of stewards.

"The future of our planet requires that young people take an active interest in the choices we're making that affect it," ARC's Hoffman says, adding that a connection to place is an essential foundation for environmental awareness.

By supporting youth programs, you help create the foundations on which Selena and many others are building. ■

TREASURES FROM THE YOSEMITE MUSEUM

BY EPHRIAM DICKSON


10—69 ys

FEE $5.00 No. 5920

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
YOSEMITE NATIONAL PARK
AEROPLANE PERMIT

(Issuing station) MAY 27 1919

(State) (License No.) (Date)

(Make of automobile)

FEE PAID BY AND PERMIT ISSUED TO:

(Name of owner or of driver)

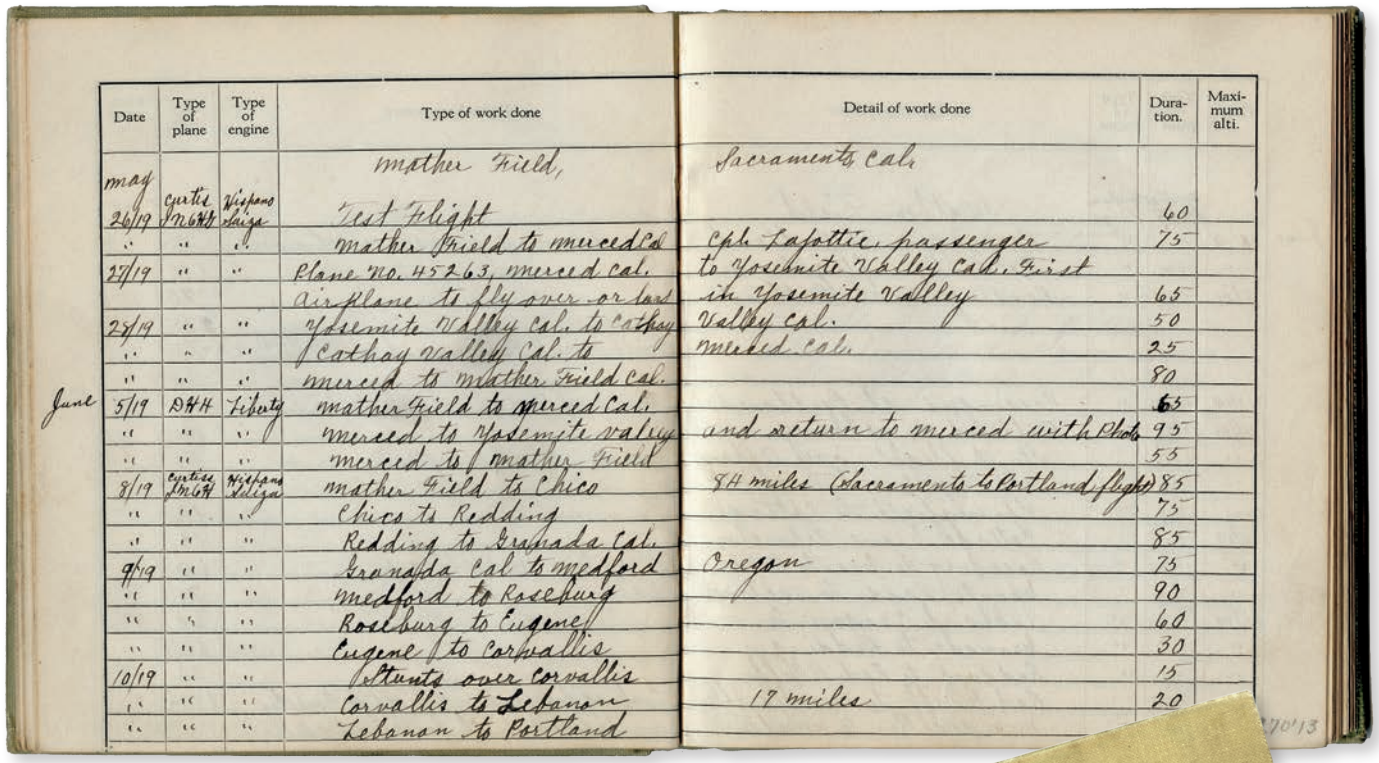
NOTE.—This permit is issued and accepted subject to the regulations governing the park, and entitles the permittee to right of passage over any or all of the roads open to traffic within the park. It is void after December 31 of the year of issue, is not transferable, and if lost can not be duplicated. It must be conveniently kept and must be exhibited to park rangers on demand. Any erasure makes this permit void.

(No. of firearms carried)

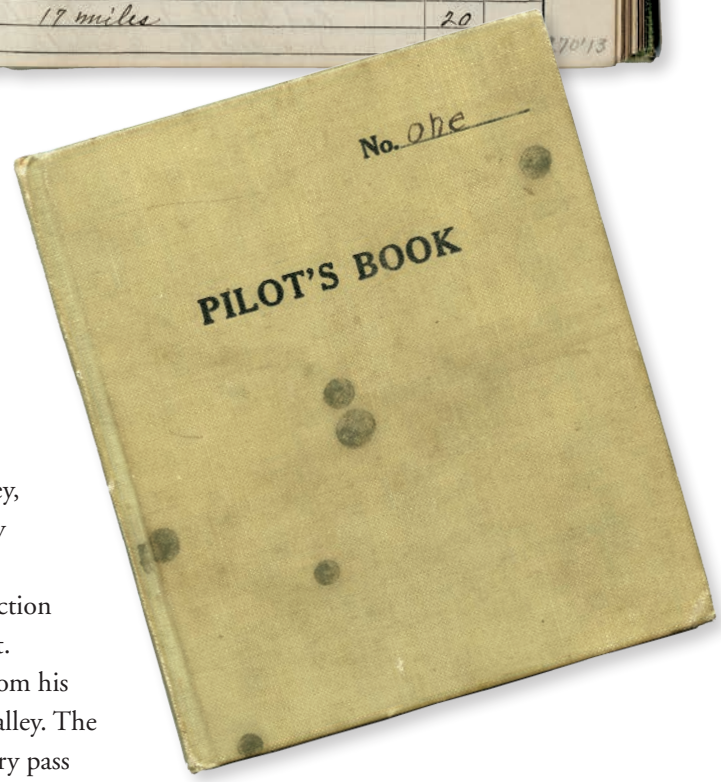
6—5751

On the morning of May 27, 1919, a Curtiss single-engine biplane piloted by First Lieutenant James S. Krull slowly spiraled down out of the sky to smoothly touch down on Leidig Meadow, becoming the first aircraft to land in Yosemite Valley.

LEIDIG MEADOW



Date	Type of plane	Type of engine	Type of work done	Detail of work done	Duration.	Maximum alti.
			mather Field,	Sacramento Calif		
may 26/19	curtiss JN6H	Hispano Suiza	Test Flight		60	
"	"	"	mather Field to merced Cal	Capt Lafattie, passenger	75	
27/19	"	"	Plane No. 45263, merced cal.	to Yosemite Valley Calif. First		
			airplane to fly over or land	in Yosemite Valley	65	
28/19	"	"	Yosemite Valley cal. to Cathay	Valley Cal.	50	
"	"	"	Cathay Valley Cal. to	merced Cal.	25	
"	"	"	merced to mather Field cal.		80	
June 5/19	D4H	Liberty	mather Field to merced Cal.		65	
"	"	"	merced to Yosemite valley	and return to merced with Pilot	95	
"	"	"	merced to mather Field		55	
8/19	curtiss JN6H	Hispano Suiza	mather Field to Chico	84 miles (Sacramento to Portland flight)	85	
"	"	"	Chico to Redding		75	
"	"	"	Redding to Granada Calif.		85	
9/19	"	"	Granada Cal to medford	Oregon	75	
"	"	"	medford to Roseburg		90	
"	"	"	Roseburg to Eugene		60	
"	"	"	Eugene to Corvallis		30	
10/19	"	"	5 Stunts over Corvallis		15	
"	"	"	Corvallis to Lebanon	19 miles	20	
"	"	"	Lebanon to Portland			



A 30-year-old native of Palmyra, Missouri, 1st Lt. Krull was an Army Air Corps instructor at Mather Field near Sacramento. After spending the night in Yosemite, he took off the following morning, performing 20 minutes of aerial stunts for the enjoyment of the gathered onlookers in Camp Curry, before retracing the Merced River out of the park. As he departed the foothills, however, his engine began to sputter, then suddenly died. The experienced pilot managed to safely glide his dead aircraft down into a field near Catheys Valley, where he cleaned out a clogged fuel line before heading on safely to Merced.

One of the treasures preserved in the Yosemite Museum collection documenting this important moment in Yosemite history is 1st Lt. Krull's original flight book, which contains handwritten entries from his landing in Yosemite, as well as his unscheduled stop in Catheys Valley. The pilot's family also donated several photographs and the signed entry pass Krull received from the chief ranger at the time of his landing.

These artifacts represent the beginning of a turning point in the history of aviation in Yosemite. By 1924, the National Park Service expressed concerns about aviation safety in Yosemite and about the impact of these noisy machines on the quality of the visitor experience. "The airplane marks the end of the silent places," one writer noted in 1920.

Just five years after 1st Lt. Krull's historic flight, the landing strip on Leidig Meadow was closed, and no further planes were permitted to land in Yosemite Valley. Leidig Meadow does, however, remain a landing strip — for powerless hang gliders who have silently launched from Glacier Point. ■

1ST LT. KRULL'S FLIGHT BOOK

These artifacts are supported and maintained thanks to the grant-funded digitization of archival materials, ensuring that they are available to researchers and are not lost to history.

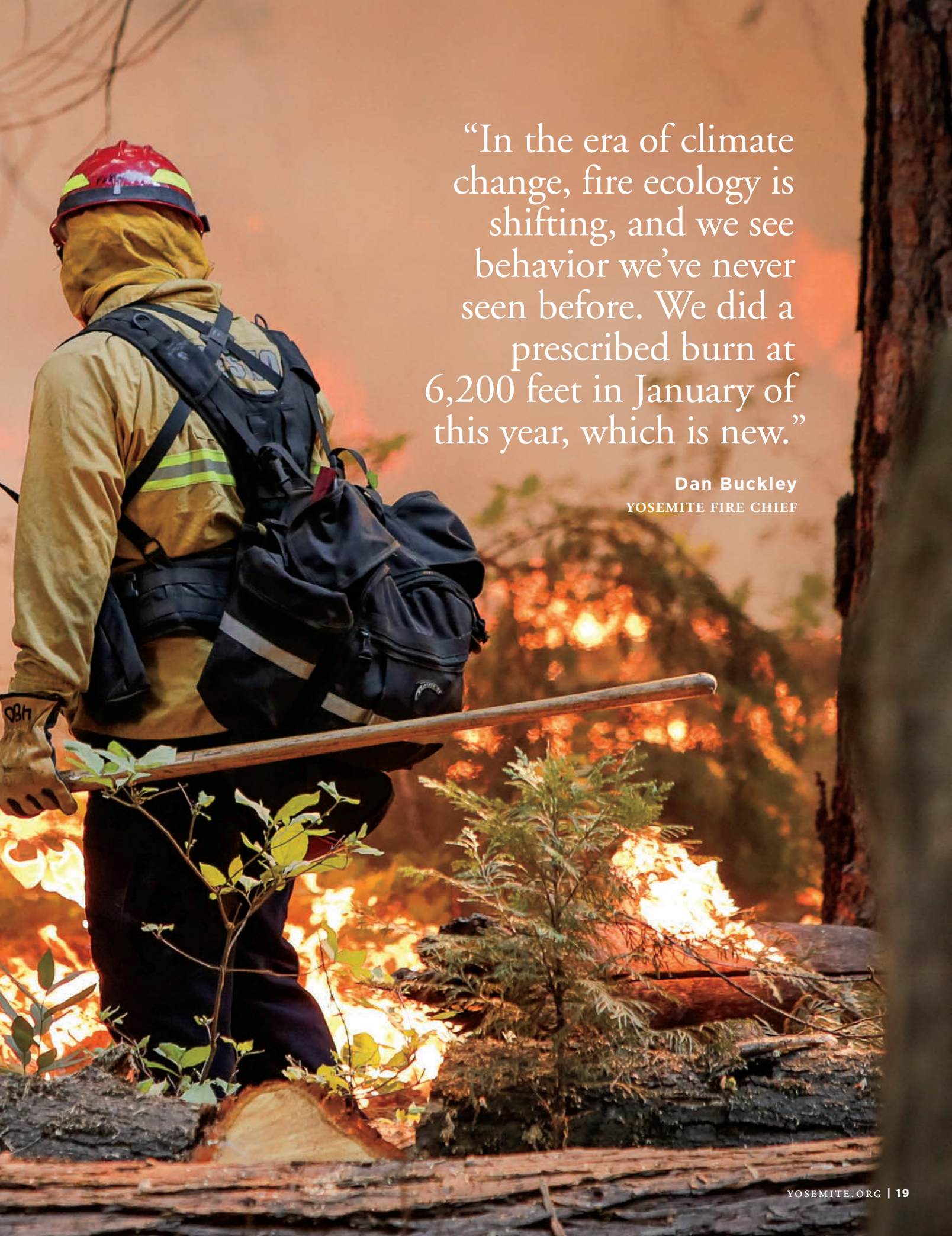
PHOTOS: (OPPOSITE PAGE) © COURTESY OF NPS. (ARTIFACTS) © COURTESY OF THE YOSEMITE MUSEUM ARCHIVES.

Fighting FIRE *With* FIRE

FLORA AND FIRE MANAGEMENT

BY MEGAN ORPWOOD-RUSSELL

YOSEMITE FIRE TEAM surveys a prescribed burn at Ahwahnee Meadow in 2016. Scheduling fire is complex but necessary — especially in areas of high visitor foot traffic.



"In the era of climate change, fire ecology is shifting, and we see behavior we've never seen before. We did a prescribed burn at 6,200 feet in January of this year, which is new."

Dan Buckley
YOSEMITE FIRE CHIEF

During the past few decades, California's fire season has been starting earlier and finishing later. Drought has exacerbated fire conditions, creating drought-stressed flora that have transformed many of the state's trees into kindling.

Many of Yosemite's fires have been human-caused and preventable, sparked by dragging tire chains, hunters' fires and through faulty power lines outside the park.

The 10 largest fires in California's history have occurred since 2000, which coincides with a trend of longer, drier summers, and shorter, drier winters. Climate change has exacerbated this cycle, and the question now is: How can California — and particularly Yosemite — adapt to such radically shifting and unpredictable weather patterns?

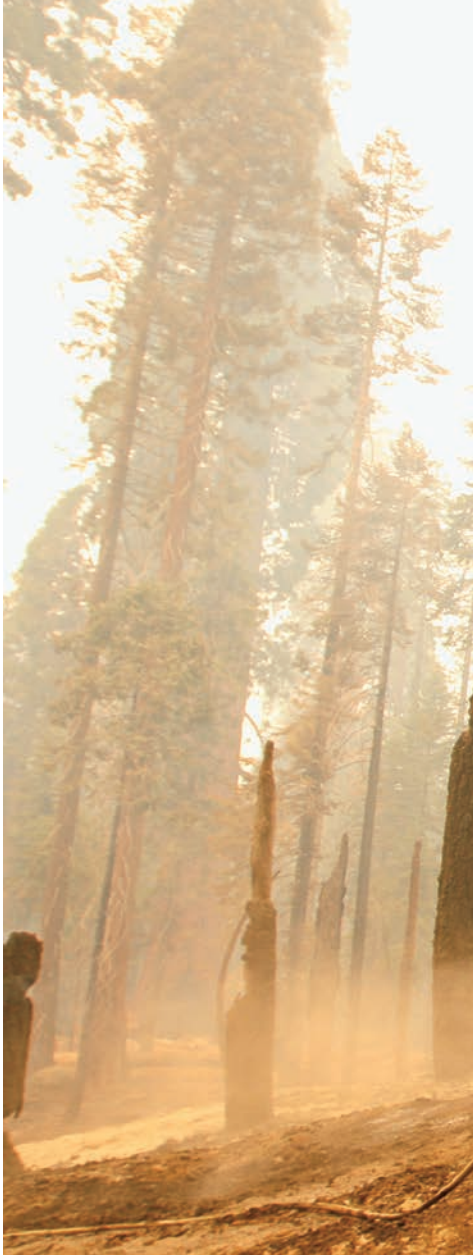
The idea of "fighting" fire was developed in Yellowstone in the 1880s. The policy was implicitly incorporated into the National Parks Act of 1916, which outlawed prescribed fires. It effectively criminalized the Indigenous practice of using fire to help steward and shape the landscape that had been in existence for thousands of years.

With colonization came a violent disregard for the ways in which Indigenous populations coexisted with the land. Native sovereignty was ignored — alongside practices of using fires regeneratively — and fire suppression was widely adopted as a best practice in California.

More than 100 years later, we're seeing the extreme downsides of this practice, and we now understand what Indigenous cultures have seemingly always known: Fire is an essential part of our ecosystems.

Yosemite's fire records go back to 1930. But we know, ecologically, fire has always been part of the landscape. For example, sequoias germinate due to fire, as do with many other fire-adapted flora.

It was only in the 1970s, when the National Park Service noticed a decline in sequoias, that prescribed burns were reintroduced in Yosemite. This decision was informed, in part, by research following the 1955 McGee Fire, which tore through 13,000 acres and threatened Sequoia National Park. Research scientists found that fire was essential for establishing a seedbed for young seedlings to flourish; it was beneficial to many



FIREFIGHTERS cool giant sequoias during the lightning-caused Windy Fire in September 2021. So far this wildfire has destroyed more than two dozen giant sequoias. "Cooling hot spots is tedious, dirty and dangerous" says Garrett Dickman. "But all the firefighters I worked with out there said they felt honored to be working to save the big trees."

PHOTOS: (PREVIOUS PAGE) ©PAUL MOREAUX. (ABOVE) © COURTESY OF NPS/GARRETT DICKMAN.

different species of flora and fauna; and it was a solid tool for preventing disease and controlling insect populations.

Yosemite has had great success in maintaining and managing fires since the 1970s. The park is a matrix of fire history, with older fires forming an interlocking jigsaw puzzle with newer burns. The practice of allowing some naturally occurring fires (from lightning strikes) to burn slow and low has been effective at minimizing vegetation, which in turn, provides less fuel to future fires.

But reintroducing fire after decades of suppression presents challenges. Non-native grasses are a particular issue: Both Medusahead grass and Yellowstar thistle burn hot and fast, often creating a ground corridor that fire can travel along at speed. Part of the work at recently acquired Ackerson Meadow is to remove the Medusahead grass that sits on the perimeter. The sustained drought in the park also renders the reintroduction of native grass species challenging: All flora are fighting for scant resources under these conditions. Still, Yosemite has already seen some ecosystem level change: After decades of devastating fires, Foresta is now home to shrubby oak and non-native grasses, which have grown in place of the destroyed forest that once gave the area its name.

There is no doubt about the necessity of prescribed burns to protect Yosemite. But how does the park plan both for and around fire? In other words, how do resource managers balance the need for controlled burning with preparation for unpredictable wildfire?

First, fire history and fire ecology are mapped to better understand where a prescribed burn will be successful. The ideal burn exists in an area close to land that has recently burned, so the fire cannot travel with any speed.

BURN PILES smolder during a controlled fire in Yosemite Valley. The debris is collected from the forest floor by hand and also using mechanical thinning. Smoke from a prescribed burn curls up through the Valley. Planned fires make up a small percentage of the hundred or so fires Yosemite experiences every year and are essential to limit megafires. When sequoia pine cones are exposed to heat, the resin that seals them shut melts, and they are able to release their seeds for germination.

PHOTOS: (TOP & BOTTOM LEFT) © COURTESY OF NPS. (BOTTOM RIGHT) © YOSEMITE CONSERVANCY/KEITH WALKLET.

"The big trees need our help. And I'm hopeful that we can do it. We know what to do and how to do it. It's just willpower that we need to make it happen."

Garrett Dickman
YOSEMITE NPS BIOLOGIST

HOW DO FIRE TEAMS PLAN FOR THEM?

"Some prescribed burns are planned up to five years ahead," says Garrett Dickman, Yosemite NPS biologist. "The fire needs to be effective. But the prescription window may only be a couple of days a year. On those days, is there good air? Do you have your compliance done? This can take six months to a year, due to endangered species and cultural artifacts. Do you have the money? Is there another fire nearby that makes this a bad idea?"

It's a delicate balance that requires constant preparation. Mechanical vegetation-thinning work is undertaken by Dickman's team in the park, with support from young adults working with California Conservation Corps and Indigenous groups offering support through CHIPS (Calaveras Healthy Impact Products Solutions), a nonprofit organization that provides forestry jobs in the foothills of the Sierra Nevada. More than 80% of CHIPS' workforce are Native American, most of whom are from the Miwuk and Paiute tribes of Yosemite.

Traditional, cultural fires are happening more frequently, and several are currently planned through the Conservancy-supported Black Oaks Restoration project. This tribal-led effort to care for trees that served as a primary food source for thousands of years is one sign of the gradual return of stewardship from the park service to Indigenous groups.

"Incorporating traditional ecological knowledge and techniques that were used to help black oaks produce high-quality acorns… as well as allowing opportunities for tribal knowledge to pass from elders to youth, are some of the ways the National Park Service and Yosemite Conservancy can promote a more resilient black oak ecosystem," says Irene Vasquez, the park's cultural ecologist. (Read more about this on page 7.)

Mechanical thinning and burn piles are just part of fire management. Using naturally occurring lightning fires in the park is also an essential part of how the park restores ecosystems through burns.

Most prescribed burns are small — fewer than 100 acres — mostly because setting 1,000-acre fires has become increasingly difficult to undertake without negatively affecting overall air quality. But it is still possible to make great progress with smaller fires. In 2020, around 9,200 acres of Yosemite were managed with controlled burns.

"We need to start treating opportunities to start a prescribed burn with the same speed as we respond to wildfires," says Dan Buckley, branch chief of fire and aviation at Yosemite, who has been working with fire for decades. "If we don't strike the match now, all we're doing is putting off worse fires in the future."

Controlled burns protect the land from megafires and serve as vital species preservation. When there is less to burn, fires run out of energy faster. When this is combined with fire management urgent response, large blazes can be extinguished with greater speed. Yosemite has reintroduced thousands of acres through prescribed fire, and the great hope is that the park continues to protect and steward the land with fire.

"There are good parts of bad fires, and bad parts of good fires," Dickman says. "The big trees need our help. And I'm hopeful that we can do it. We know what to do and how to do it. It's just willpower that we need to make it happen." ■

MEET THE TEAM:

TINA MOSELEY

TINA MOSELEY hiking in Yosemite's high country (Above).

Tina Moseley and Carrie Toepper, Yosemite National Park Facility Operations Specialist (Right) sort and count disposable isobutane cylinders as part of a volunteer fuel cylinder count.

PHOTOS: (ABOVE) © HBECKY HASKELL. (OPPOSITE PAGE) © JOANNE BRASCH.

SIX YEARS AGO, the National Parks Conservation Association (NPCA) and Subaru of America teamed up to launch the Zero Landfill Initiative (ZLI) to reduce waste in national parks, starting with pilot programs in Denali, Grand Teton and Yosemite. Since the initiative began, the three national park pilots, combined, have diverted 16 million pounds of waste from their local landfills.

In 2021, Yosemite Conservancy took on a leadership role in this work with the addition of our zero landfill and sustainability coordinator, Tina Moseley. Moseley works with the National Park Service, Yosemite Hospitality, Mariposa County, ZLI leaders and other partners to help move Yosemite toward zero-waste status. We interviewed Moseley to find out ...

... how she got involved in sustainability work.

Working in food and beverage in the park, I was struck by the amount of waste generated — especially plastic straws! I wanted to be a part of the solution. I eventually landed a sustainability-focused job with Yosemite Hospitality, and my favorite aspect of that position was its focus on the Zero Landfill Initiative and waste diversion. I'm absolutely thrilled to now work on these issues for the Conservancy, an organization whose mission — to preserve Yosemite and enhance the visitor experience today and for future generations — is practically the definition of sustainability.

... her most exciting recent accomplishment.

Definitely the success of the new Residential Food Waste Diversion Pilot, an effort to help separate and then compost organics from Yosemite's landfill-bound trash, which launched on August 1 of this year. So far, we have 150 local households, groups, and commercial kitchens enrolled. In just one month, we've already collected over 17,500 pounds of food waste, which Mariposa County can convert to high-quality compost for local farmers using their new-and-improved composting equipment (generously donated by Subaru and the ZLI).

... if reducing Yosemite's waste helps combat climate change.

YES! Not only does diverting food waste increase the lifespan of our local landfill, but by separating, collecting and composting food waste, we're also reducing the emission of methane, a powerful greenhouse gas.

Another waste reduction initiative with climate implications? The Propane Cylinder Recycling & Education Pilot, another project of the Zero Landfill Initiative. Single-use or disposable propane canisters are made of hot rolled steel, so their production has a huge environmental footprint. Plus, spent disposable cylinders are difficult and expensive to store, transport

and recycle, because they are classified as hazardous waste. Refillable propane cylinders have the potential to prevent millions of pounds in greenhouse gas emissions in the state of California alone, according to a 2017 report in Waste Advantage Magazine.

... how park visitors can contribute to environmental sustainability initiatives in Yosemite.

You might be surprised by my suggestions: 1) bring your own water bottle and coffee mug, and 2) pack a reusable tote bag for supplies and souvenirs. These simple steps really do make a big impact.

Also, please be mindful of what you bring to the park, and plan to take it home with you, even if it breaks. The population of Mariposa County is around 17,000 people, and our facility struggles to support the waste stream of Yosemite's 4 million annual visitors. Please dispose of unwanted camping equipment, portable appliances and propane cylinders in your county of residence, and separate your recyclables during your visit. It makes a huge difference! ■

This project is made possible, in part, by a grant from the National Park Foundation through the generous support of Subaru of America. Learn more at **yosemite.org/sustainability,** and stay tuned for more **"Meet the Team"** features in future issues of the magazine.

YOU MAKE A *Difference*

WHILE THE WORLD RECOVERED in starts and stops this year, Yosemite Conservancy grant-funded work hit the trail running and didn't look back. California Conservation Corps (CCC) members returned to the backcountry rehabilitating trails; infrared camera traps collected images and data on mountain lions, red fox and other wildlife; and dozens of kids from Central Valley and Bay Area schools entered the gates of Yosemite for the first time through the Parks in Focus and Adventure Risk Challenge programs. As fires burned throughout much of the west, stewardship of Yosemite's sequoias, black oaks and sugar pines helped promote their resilience and longevity.

So far this year, your support has helped our National Park Service partners ...

... host four interns for 12 weeks through the **YOSEMITE LEADERSHIP PROGRAM** — a decade-long partnership with UC Merced that engages, educates and employs the next generation of environmental leaders.

... invite members of Yosemite's seven affiliated tribes to steward Yosemite Valley's **BLACK OAK GROVES.** Black oaks were planted, tended, burned and harvested by tribal members for centuries. This summer and fall, tribal members tended Valley oak groves in preparation for prescribed burns. Two-fold restoration reestablishes relationships and connection while promoting the health of the trees.

... reduce fire fuels in the **MERCED GROVE OF GIANT SEQUOIAS** with the help crews from Calaveras Healthy Impact Product Solutions (CHIPS). CHIPS is a nonprofit organization that provides on-the-job training to California Native Americans in forest and meadow restoration, watershed stewardship, cultural site work and fire-safe fuel reduction in the wildland-urban interface.

PHOTOS: (YLP, CCC & MOUNTAIN LION) © COURTESY OF NPS. (OBATA) © COURESTY OF NPS/CARL CALHOUN. (BLACK OAK & MERCED GROVE) © YOSEMITE CONSERVANCY/RYAN KELLY. (VETERAN'S) © MICHAEL ADAMS.

... oversee **CCC** crews providing maintenance to more than 105 miles of Yosemite's trails.

... partner with UC Merced to support the 2nd annual **VETERAN'S EDUCATION AND LEADERSHIP SEMINAR** in Yosemite. The seminar is designed to provide inspiration, training and support to veterans. Participants spent one memorable afternoon with longtime Council Member Michael Adams who took on rock-star status with the group. He shared his tale of being born and raised in Yosemite, joining the Air Force and flying F-86s in Korea and later F-4s, and rising to major general and deputy surgeon general, after getting his MD through the GI Bill.

... host the 1st annual **OBATA ART WEEKEND** in Tuolumne Meadows, a 3-day event celebrating the legacy of American artist Chiura Obata and his time in Yosemite. Speakers and teachers from Manzanar National Historic Site, Minidoka National Historic Site, Honouliuli National Historic Site and the Japanese American National Museum joined Yosemite National Park rangers in creating a memorable experience.

... "capture" **MOUNTAIN LIONS** in the wild at 31 different camera locations throughout the park!

Change is the Only Constant

Each issue of the magazine will include Junior Ranger pages, special content intended for school-age kids.

The Earth is always changing. Sometimes change happens very slowly, sometimes it happens very quickly. Sometimes change is driven by the forces of nature, sometimes it is driven by humans. Humans, more than any other species in the natural world, have tremendous power to change the landscape. It's important to understand the Earth, as many scientists do, to help make good decisions about how best to live in harmony with all living things.

Scientific understanding begins with curiosity and making good observations. Junior Rangers are already well-equipped scientists! By using just your five senses, you can learn a lot about the world around you.

Tune up your senses by going outside. Focus on each of your five senses (plus one!), and write down your observations about nature:

I see _____

I hear _____

I smell _____

I taste _____

I feel (with your hands!) _____

I feel (this is the sense that comes from your heart, your feelings)

_____

Stay Curious!

One way animal and plant species deal with challenges is through adaptation or making a change to better fit the environment. Junior Rangers can think about adaptation by pondering some questions.

What are some things you can do if it is too hot to play outside?

Now, pretend you are a pika that prefers living in the cool temperatures of the high alpine mountains, and your home territory has become too hot. What is something your species could do?

AUTUMN

Acorn woodpecker

California black oak

Storing food for winter

Gray squirrel

Migration

Mule deer

Wildfire

WINTER

Glacier

Black bear

Pika

Decreasing snowpack

Hibernation

Clark's nutcracker

Monarch butterfly

Red-winged blackbird

Regrowth

SPRING

Snowmelt

Flooded meadows

Pacific chorus frog

SUMMER

Melting snow

Sierra Nevada bighorn sheep

Become a Junior Ranger

Find the official Yosemite Junior Ranger Handbook and products at **shop.yosemite.org**

YOSEMITE THROUGH YOUR LENS

Park fans share their photos of Yosemite.


A


B


D


C

A Winter Yosemite Firefall
© CONLON CREATIVES.

B Fire Season in the Valley
© FRITZI DROSTEN.

C Snowy Yosemite Falls
© NICK MINERVA.

D Smoke, Dead Tree — an Erratic 2019
© CARLOS DAVIDSON.

Thanks for sharing your shots, Yosemite fans! To see more photos of the park, and share your own, follow us on social media:

@yosemiteconservancy
@yoseconservancy
flickr.com/groups/yosemiteconservancy

Ways to Give

There are many ways you and your organization can support the meaningful work of Yosemite Conservancy. We look forward to exploring these philanthropic opportunities with you.

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WE'VE MOVED!

Follow the Conservancy on social media to stay in touch on the go:

PHOTO: © MICHAEL WHITE.

Your Legacy
makes a difference for Yosemite

YOU CAN MAKE an investment that will protect Yosemite and support its visitors, its wildlife and its natural beauty for generations by creating a legacy gift.

When you include Yosemite Conservancy as a beneficiary in your will, trust or retirement account, you ensure the park remains well-preserved and accessible. Your gift provides for Yosemite's future, and in the meantime, it entitles you to membership in our Legacy Society.

To learn more about how to create your legacy for Yosemite, contact Catelyn Spencer at **cspencer@yosemite.org** or **415.891.1039.**

yosemite.org/legacy