

# REDWOODS

The Magazine of Save the Redwoods League

Autumn | Winter 2017

## Mapping Redwood Genomes

*League Leads  
Critical Research*

## Fire Management

*Question and Answer*

## Stewarts Point

*Wandering a  
Coastal Wonderland*

## The League's Centennial

*Celebrate 100 Years of  
Pioneering Conservation*

*Save The Redwoods*  
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Since 1918, Save the Redwoods League has protected and restored redwood forests and connected people with their peace and beauty so these wonders of the natural world flourish. Your donations help us purchase redwood forests and the surrounding lands needed to nurture them; regenerate logged forests so they become spectacular havens for future generations; study how to best protect and restore these global treasures; and introduce people to these magical places.



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*“This work has tremendous implications for conservation forestry and for future coast redwood and giant sequoia restoration plans.”*

Emily Burns, PhD, Director of Science, Save the Redwoods League, about the Redwood Genome Project.

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Last winter's storms toppled famous ancient redwoods, reminding us of the need to grow old-growth forests for future generations.

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### CONTRIBUTORS



*Top row, from left*

**Glen Martin** was an environmental reporter for the *San Francisco Chronicle* for many years, and has contributed to more than 50 magazines, including *Discover*, *Audubon*, *Forbes* and *Outside*.

**Jon Parmentier** says he was lucky to spend seven years among the redwoods, photographing them, hiking and composing music.

**Dana Poblete** is a Los Angeles-based writer who covers sustainable lifestyles and natural history for publications including *Condé Nast Traveler* and *Audubon*.

*Bottom row, from left*

**Mike Shoys** is a lifelong resident of the redwood range. A life of backpacking, hiking and other outdoor pursuits led him to become a passionate conservation photographer.

**Andrew Slack** joined Save the Redwoods League in 2016 as a Forest Fellow after earning a master's degree in forestry and fire ecology from Humboldt State University.

**Paolo Vescia** is a lover of trees and an award-winning photographer based in Pacifica, California. His work has appeared in *The New York Times*, *Smithsonian*, *Rolling Stone* and various California newspapers.

Coast redwoods stand as ancient sentinels in Del Norte Coast Redwoods State Park (COVER) and in Jedediah Smith Redwoods State Park (THIS PAGE). The pioneering work of the League's Redwood Genome Project will help us better understand forests like these so that we can better care for them.

**Learn more on page 12.**





Dear Save the Redwoods League Friends,

We are delighted to present this first issue of *Redwoods* magazine, which replaces our longtime *Bulletin* newsletter. *Redwoods* reflects how Save the Redwoods League is reimagining how we will protect, restore and connect people to the redwood forest as 2018, our centennial year, approaches.

In this publication, we will elevate the national dialogue about redwoods and their conservation through in-depth articles that explore the forest in a broader environmental context, beginning with the story about our Redwood Genome Project. This pioneering work will help us understand — and eventually restore — the genetic diversity and resiliency of redwood forests. This project and others are part of our vision for our next 100 years. Our commitment to protecting the remaining old-growth redwoods has never been stronger, and in our next century of work, we will pursue our vision of healing younger redwood forests and regenerating the resiliency, diversity and splendor of California's old-growth coastal forest for future generations. As we devote ourselves to protecting and restoring California's redwood forest, we will restore our collective connection to our spectacular redwood parks, creating world-class park facilities and experiences that are worthy of these global treasures and that inspire visitors from all walks of life.

*Redwoods* will include stories of how we are realizing our vision for our next century, in addition to features that you have requested through our surveys. You will find more breathtaking photos, answers to your questions, details on parks to visit, images from our archive, and your stories and photos.

We hope you enjoy this inaugural issue. Please let us know what you think of *Redwoods* by emailing [Redwoods@SaveTheRedwoods.org](mailto:Redwoods@SaveTheRedwoods.org) or sending us a note to our address on the back cover.

**Sam Hodder**  
President and Chief Executive Officer  
Save the Redwoods League

Read Sam's blog at  
[SaveTheRedwoods.org/SamsBlog](http://SaveTheRedwoods.org/SamsBlog)

Connect with Sam on Twitter  
[@SamH4Redwoods](https://twitter.com/SamH4Redwoods)

**THE LEAGUE'S CENTENNIAL**  
**CELEBRATE 100 YEARS OF PIONEERING CONSERVATION**



**STAND** FOR THE  
**REDWOODS**  
 STAND FOR THE FUTURE

Save the Redwoods League is one of the nation's oldest conservation organizations. Since our founding in 1918, collaborating with landowners, public agencies, conservation organizations, donors and others, the League has protected more than 204,000 acres of redwood forests. In that time, we have helped create 66 redwood parks and reserves and pioneered innovative, science-based forest-restoration work. Soon we will celebrate these achievements and the League's Centennial with commemoration events and activities, including these highlights and a few surprises!

**ExploreRedwoods.org**, a free, mobile-friendly tool, will help you customize an itinerary for your visit to the redwood forest.

We will offer **free passes to California Redwood State Parks** for the second Saturday of every month in 2018.

For just \$125, the new **Centennial Redwood Celebration Golden Poppy Annual Pass** will provide access to more than 110 California State Parks, including incredible redwood parks, throughout 2018.

A free **exhibit of our 100-year legacy of conservation leadership** will open on April 20, 2018, in The Bancroft Library at the University of California, Berkeley.

Mark your calendar for our **Centennial Celebration Gala, the party of the century**, on October 13, 2018, in San Francisco. The Gala will benefit the League's education and park support programs, which serve more than 7,500 schoolchildren and millions of redwood park visitors each year.

We look forward to celebrating with you and will provide details in upcoming publications and on our social media channels.

Protecting the Home of the World's Tallest Trees

Two Steps Support Crucial Wildlife Habitat

In California's northwestern corner lies the Prairie Creek Scenic Corridor, a patchwork of public and privately held lands surrounded by Redwood National and State Parks, home of the world's tallest trees. The League and collaborators have been working toward a vision of protecting the corridor from development, reconnecting the parks' ancient redwood groves, restoring prime wildlife habitat and creating an innovative visitor center.

Earlier this year, the League completed an important step toward achieving this vision, transferring the 5.9-acre Berry Glen Trail Connection property to Redwood National Park. The transfer secures crucial habitat for Roosevelt elk and coho salmon, as well as the intersection of favorite hiking trails.

In another important step, the League and California Trout recently received a grant from the National Oceanic and Atmospheric Administration to restore habitat for imperiled salmon at the confluence of Prairie and Redwood creeks. Learn more at [SaveTheRedwoods.org/PCSC](http://SaveTheRedwoods.org/PCSC).



ABOVE In 1921, the League dedicated its first memorial grove to Colonel Raynal C. Bolling in Humboldt Redwoods State Park.

LEFT The League's transfer of the Berry Glen Trail Connection property to Redwood National Park protects crucial wildlife habitat for coho salmon and Roosevelt elk like these.

Photos: page 4 clockwise from top: Carole Baskin, Flickr Creative Commons; Random Truth, Flickr Creative Commons; Julie Martin; Paolo Vescia. Page 5, top, Paolo Vescia. This spread, clockwise from upper left: unknown, William Croft, John Birchard, League staff.





## Thank You for a Crescendo of Support

### Millions Defend Giant Sequoia, Other Monuments

Save the Redwoods League thanks our community for responding to our call for public comments on what Giant Sequoia National Monument means to them. Comments from League supporters were counted among a record-breaking 2.8 million after the Trump administration ordered a review of certain national monuments. The review threatens protections for 27 incredible places, including Giant Sequoia, and undermines conservation successes made under the 1906 Antiquities Act. Save the Redwoods League will be as active and committed to defending the monument as we were in helping to create it years ago.

More than 99 percent of comments submitted to Regulations.gov supported our public lands; 95 percent of comments about Giant Sequoia National Monument supported maintaining current boundaries. This monument protects natural wonders that exist nowhere else, supports local jobs, keeps clean water flowing to farms downstream, and helps mitigate climate change. The ancient groves, archeological sites and other special objects in the monument are an irreplaceable part of our nation's heritage. As of press time, the fate of Giant Sequoia National Monument was unknown. Please read League publications and our social media for updates.

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Thanks to our generous donors, California voters and the State of California Wildlife Conservation Board (WCB), Save the Redwoods League is set to complete the first phase of our Mailliard Ranch project, which protects three-quarters of this majestic property from development and subdivision. Protection of the ranch will secure the stability of the regional forest ecosystem.

Inspired by the challenge offered by Justin Faggioli and Sandra Donnell, League Board Chair and Councilor respectively, to match all new gifts up to \$250,000, League donors closed the \$500,000 gap by the May 25, 2017, deadline.

On the same day, the WCB granted the League \$4.75 million toward the purchase of conservation easements for three-quarters of the ranch — the West and Middle portions. We thank the WCB for sharing our vision of conserving this 11,178-acre Mendocino County landscape rich in mature redwood forests, wildlife and streams. The WCB's grant represents some of the last remaining funding from Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006, which was approved by California voters in the 2006 general election. We thank California voters for their investment in our natural resources.

In addition, the California Natural Resources Agency's Environmental Enhancement and Mitigation Program awarded \$500,000 for the West portion and \$500,000 for the East portion.

The League is seeking public and private funding to complete the final phase in Mailliard Ranch's protection over the next two years.

Meeting these goals today shows how public and private funding are the keys to our work in protecting, restoring and connecting people to the redwood forest, our American treasure. Learn more at [SaveTheRedwoods.org/Mailliard](http://SaveTheRedwoods.org/Mailliard).

## Milestones for Mailliard

### League Set to Secure Most of Vast Ranch



ABOVE The League worked on a 1990 settlement that banned commercial logging in what is now Giant Sequoia National Monument. William Croft, League Board of Directors Member, took this photo of his wife Carol Toffaleti in 1989 as they mapped the groves' boundaries.

LEFT Redwood forest covers the rolling landscape of Mailliard Ranch. Protecting the ranch will safeguard these precious forests, abundant plant and animal habitat, as well as clean air and water.

# When Icons Fall

The Need to Grow Giants of the Future



ABOVE Shown before it fell last winter, the famous giant sequoia in Calaveras Big Trees State Park was called the Pioneer Cabin Tree after private owners cut it to make it resemble a cabin.

RIGHT A 1991 storm toppled the Dyerville Giant (on the left side of the photo) in Humboldt Redwoods State Park. Additional giants (on the top right of the photo) fell in the last two winter storms.

When a storm last winter toppled the Pioneer Cabin Tree, an iconic “drive-through sequoia” in Calaveras Big Trees State Park, the news and grief spread across the nation in media from the *Los Angeles Times* to *The New York Times*. The 1,000-year-old giant sequoia was famous for the car-sized tunnel cut through its trunk in the late 1800s to attract tourists.

Last winter’s intense wind and rain brought down giants throughout the redwood range, including the 1,000-year-old Advocate Tree in the Forest of Nisene Marks near Santa Cruz, and a 300-footer in Prairie Creek Redwoods State Park near Klamath. It is true that seeing any of these towering giants fall is sad for

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When we lose an ancient giant like the Pioneer Cabin Tree, it is heartbreaking because we have so few left. The grief speaks to the urgency of the League’s efforts to expand and restore logged forests to grow the old-growth forests for future generations.

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us because we have so few left. Only 5 percent of the original old-growth coast redwood forest remains along the California coastline between Big Sur and the Oregon border, and the last remaining giant sequoia live in scattered groves along the western slopes of the Sierra Nevada. But under the surface of the sadness lies a brighter, long-term scientific view.



When a giant redwood falls, it begins a critical phase in the forest lifecycle, contributing to the environment in different ways. Critical to biodiversity, they create gaps in the canopy, bringing light to the forest floor for younger trees to thrive. They provide habitat for a wide variety of wildlife, from insects to black bears. Trees that have fallen into and across streams provide calm pools and new shaded habitat, perfect for imperiled fish like coho salmon and steelhead trout. Downed trees also provide recycled nutrients for new herbaceous plants, mosses, lichens, fungi and other trees. And because redwood is extremely slow to decay, the large amounts of carbon that the tree absorbed while alive will remain in its wood for decades, if not centuries, allowing the fallen giant to continue to play a lead role in the climate change solution.

With your support, Save the Redwoods League can work hard to make redwood habitats as healthy as possible. Our broad-scale forest restoration projects in the next 100 years will strive to link old-growth groves to protected, regenerating forest, creating conditions for massive redwoods to grow in much larger areas. Yes, trees will still fall, but for future generations, these events will reflect the dynamic nature of a healthy forest. If we commit to our work as stewards of the world's most superlative forest, young forests will heal and become forests of giants, standing tall in an intact ecosystem, the likes of which we have never seen in modern times. 🌿

Contributors: Kyle Cooper, Mike Kahn, Deborah Zierten

#### WHAT

Ancient redwoods, including a famous “drive-through sequoia,” fell during last winter’s storms

#### WHERE

Throughout the redwood range

#### LEARN MORE

Listen to a radio interview of Emily Burns, Director of Science for Save the Redwoods League, in which she talks about the Pioneer Cabin Tree and reveals surprising facts about giant sequoias:

[SaveTheRedwoods.org/PioneerCabin](https://www.savetheredwoods.org/PioneerCabin)

Read about Redwoods Rising, an ambitious new project by the League and Redwood National and State Parks to grow old-growth forests for future generations:

[SaveTheRedwoods.org/RedwoodsRising](https://www.savetheredwoods.org/RedwoodsRising)



MAPPING THE  
**Redwood Genomes**

The League leads pioneering research to provide the critical tool in re-establishing logged forests' genetic diversity and resiliency

For anyone new to the San Francisco Bay Area, Redwood Regional Park in the Oakland hills comes as a surprise: 1,830 sylvan acres just minutes from some of the most densely populated real estate in the nation, with 40 miles of trails providing a critical recreational relief valve for diverse urban hikers, runners and equestrians.

The park also burgeons with wildlife. A number of charismatic species, including golden eagles, rainbow trout and mountain lions, dwell here. Several distinct biomes are contained within its borders, including mixed coniferous forest, hardwood forest, grasslands and chaparral.

But it is the park's eponym, the coast redwood, that is both the signature species and the emblem for this property. If you live in San Francisco or the East Bay and you decide to take a quick hike through a redwood forest, this is likely where you'll come. Still, this isn't a land of ancient giants, of trees with diameters exceeding 20 feet and heights of more than 300 feet. While these

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In the last 150 years, every instance of redwood cutting and planting has selected for specific genes, intentionally or unintentionally. As with all living things, genes play a tremendous role in the destiny of redwood trees.

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woods — to paraphrase Robert Frost — are lovely, dark and deep, they're also young; few redwoods are older than 100 years. While the individual trees are lofty and robust, they're relatively small when compared to their venerable counterparts in the old-growth groves of the North Coast.

This redwood forest also differs from ancient groves in another way: genetics.

"We know that every decision made on redwood lands over the past 150 years has altered the genetic structure of the forest," said Emily Burns, PhD, Director of Science at Save the Redwoods League, during a recent hike in Redwood Regional Park. "Every tree cutting, every replanting project, every restoration thinning — they've all selected for specific redwoods and their genes, intentionally or unintentionally."

And that could be a problem, said Burns. As with all other living things on the planet, genes play a tremendous role in the destiny of redwood trees. Genes can determine if a given tree grows rapidly or slowly; if it can thrive in relatively poor soil or if it requires rich, deep loam; or if it can withstand drought and fight off diseases.

These qualities have particular urgency in the period of climate change that we are now experiencing. Increasingly, scientists refer to this emergent epoch as the Anthropocene — the one superseding the current Holocene, and the first characterized by human impacts.

"There is broad consensus in the scientific community that our climate is changing," said Burns. "As a whole, our atmosphere and our seas are getting warmer. There are multiple implications to these shifts, and many of them are worrisome. But we don't have to accept them passively. There's still much we can do to attempt to slow the process of climate change and ameliorate some of its effects."

Redwoods and giant sequoias once dominated much of Earth; the great trees were the haunts of the dinosaurs, and after that the mammalian megafauna. But over millions of years, they have been reduced to one isolated area. Coast redwoods now inhabit a narrow littoral strip from just north of the Oregon border to Big Sur, and giant sequoias naturally grow only in 75 groves scattered along

Redwoods like this one in Oakland's Redwood Regional Park bear wavy bark, a characteristic determined by genes.

the western slope of California's Sierra Nevada. Since its founding, Save the Redwoods League has been devoted to preserving these remaining stands, protecting them from heavy logging and development.

### RESTORING THE LOST FORESTS

In recent years, the League's mandate has expanded to restoration, Burns said. League scientists, volunteers and donors have committed to accelerating old-growth characteristics in young forests by retiring roads, stabilizing soils, selectively thinning overstocked stands, and enhancing riparian woodlands.

"Our research has shown that these restoration treatments create many desired outcomes," Burns said. "For example, thinning accelerates tree growth rates. However, we don't yet understand how these and other management practices affect forest genetic diversity. That's why we've launched the Redwood Genome Project with our collaborators, the University of California, Davis, and Johns Hopkins University."

The project harnesses the latest genomic research methods. Genome sequencing, or determining the order of DNA bases that make up the complete set of genes, has not been possible in conifers until relatively recently. The undertaking will be truly Herculean in the case of coast redwoods because they're hexaploid: They have six sets of large chromosomes, unlike human beings and giant sequoias, which have two sets (and are hence known as diploid). The coast redwood has a genome 10 times larger than the human genome, and that's one reason it hasn't been sequenced. While the giant sequoia genome is smaller, it is still three times the size of the human genome. But it's essential to sequence both species as soon as possible.

Why? The traits that redwoods and giant sequoias need to weather the rapidly changing climate are expressed through their genes, said Burns. Identifying and protecting forests with diverse genetic traits will help forest managers and conservationists increase the likelihood that the forest will survive and thrive in future conditions.

As the League and its allies move forward with ambitious restoration projects in coming decades, genomic information will be essential in drafting and implementing effective plans.

For example, redwoods are likely to experience significantly more stress in the southern, drier portion of their range than in the northern, wetter portion. So it's critical that we identify and protect trees that are well adapted to heat and drought — trees that can handle the coming changes.

A forest with limited genetic diversity means it has less chance of adapting to changing environmental conditions. "We need to use this new genetic research to find out where our most genetically diverse forests are and make sure they're protected," Burns said.

### CREATING A STANDARD: GENETIC CONSERVATION

The main work of the \$2.6 million Redwood Genome Project will occur over the course of three years, from 2017 through 2019. Ultimately, genetic screening will become a part of standard forest inventory protocols. The goal is to make forest genetic conservation a central element of all forest protection and restoration plans.

Preliminary League-sponsored genetic inquiries already have yielded valuable information about redwood and giant sequoia genetics that will guide the new research, said Burns. By analyzing small sections of DNA called neutral genetic markers, research grantees have discovered that small giant sequoia groves appear to be inbred; that coast redwood "fairy rings" (circles of redwoods around stumps or dead trees) are not always clones; and that the southern giant sequoia population is genetically distinct from the northern population.

"One of our recent grantees, Lakshmi Narayan from the University of California, Berkeley, obtained some stunning data during her doctoral



# RESTORING LOGGED FORESTS' RESILIENCY: THE REDWOOD GENOME PROJECT

## WHAT

The Redwood Genome Project will determine the order of DNA bases that make up the complete set of genes of the coast redwood and giant sequoia.



## WHY

Genetic screening will help forest restoration planners protect trees with adaptive traits required to tolerate future environmental stressors, including climate change, increased drought and emergent diseases.

## WHEN

2017-2021

## WHERE

Field work: throughout the coast redwood and giant sequoia ranges

## WHO

Save the Redwoods League  
University of California, Davis  
Johns Hopkins University

Lab work and computational analyses: University of California, Davis, and Johns Hopkins University

LEFT Emily Burns, PhD, League Director of Science, reaches for the captivating cream-colored needles of an albino sprout growing out of a redwood. "It lacks chlorophyll, so it's white, and it's caused by a mutation on that particular sprout's DNA," she said. Further genomic research could confirm hypotheses that albino sprouts are more than parasites. It's clear that the deeper we go into the redwood genome, the more we'll know.

*Save the Redwoods League thanks Ralph Eschenbach and Carol Joy Provan for their visionary and generous lead gift to the Redwood Genome Project.*

## MILESTONES

**Development of reference genomes for coast redwoods and giant sequoia**

**Genomic sequencing of a diverse selection of trees to identify genetic variations that indicate adaptive genes**

**Development of technologies to genotype a broad sample of trees, correlating genetics with location**

**Creation of public databases**

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research on coast redwood genetic clones in ancient forests,” said Burns. While scanning redwood trees at Big Basin Redwoods State Park for shared genetic markers, she found that genetic diversity in an old-growth stand was lowest where partial timber harvesting occurred in the past.

That discovery has tremendous implications for conservation forestry generally, and for future redwood and giant sequoia restoration plans specifically. It shows that even minor timber harvests can have profound impacts on the genetics of the forest, potentially affecting forest resiliency decades or centuries into the future. The Redwood Genome Project will expand this groundbreaking research, giving the League and collaborators the genomic tools necessary for the long-term protection of redwoods and giant sequoia.

### PROJECT MILESTONES

The Genome Project has specific milestones for its initial three years. In the first year, researchers will develop and publicly release genome sequences for coast redwoods and giant sequoia, using a tree from Butano State Park for the coast redwood genome and a tree from Sequoia National Park for the giant sequoia genome. That will provide baseline sequences for both species.

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The tools developed in the Redwood Genome Project will help forest managers regenerate the natural genetic diversity and resiliency of the redwood forest that was suppressed through generations of industrial management.

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The second year will be devoted to producing a genetic variation database for the coast redwood and giant sequoia genomes. A variation at a specific site in a DNA sequence is known as a single nucleotide polymorphism, or SNP. A DNA sequence is composed from four nucleotide bases: adenine (A), cytosine (C), guanine (G) and thymine (T). Sometimes there may be a variation in nucleotides at a given known point in a genome. With redwoods, for example, the vast majority of trees may have cytosine at a certain spot in the genome, but a small number of trees may have adenine or guanine. If more than 1 percent of the trees show a variation in a particular point in the DNA sequence, then this variation is considered an SNP.

SNPs may be completely neutral in their impacts, or they may manifest specific effects: susceptibility or resistance to a disease for example, or in the case of redwoods, relative photosynthetic capability, or the ability to withstand specific environmental conditions such as drought.

“By sequencing a diverse panel of trees, we can discover, identify and compare their SNP differences,” said David Neale, a Professor in the Department of Plant Sciences at the University of California, Davis, and a collaborator in the Redwood Genome Project.

Another collaborator in the project, Steven Salzberg, Bloomberg Distinguished Professor of Biomedical Engineering, Computer

Science and Biostatistics at Johns Hopkins University, said the hexaploid genome of the coast redwood presents a particular challenge for genomics technology. “But our recent experience sequencing the very large genomes of three other conifer species gives us confidence that we’re ready to take on the redwood,” Salzberg said.

Once the data are analyzed, they will be used to create “SNP chips,” genotyping tools that contain tens of thousands of genetic variations. Leaves will be collected in the field and taken to a lab for analysis with the SNP chips to rapidly and cost-effectively assess individual trees.


“We’ll release the SNP chip designs to the public so other researchers can use them in their own coast redwood and giant sequoia studies,” said Neale. “Their work will augment our work, and vice versa.”

During the third year, researchers will conduct genomic studies on a broad scale, using SNP chips to sample hundreds of coast redwoods and giant sequoia.

“This initial survey will allow us to refine our techniques, pointing the way for other research groups to expand our genomic knowledge base for coast redwoods and giant sequoia,” Burns said. “We anticipate that we’ll be conducting genetic assessments on a wide scale once we’ve fully deployed the genomic tools we’re developing.”

Using the genomic tools, restoration field teams will be able to tell the difference between planted clones and native trees. Then they can select clones to remove to restore the stand’s natural diversity and resiliency.

### A CAPTIVATING MUTATION

During her hike in Redwood Regional Park, Burns pointed out something anomalous in the forest — a cream-colored albino redwood sprig that stood out starkly against the surrounding dark green foliage. “It can’t photosynthesize by itself, so it’s subsidized by sugars contributed from the tree’s unaffected foliage,” she said. Albinism in redwoods occurs more in the southern portion of the range than the northern, and there’s some evidence that albino sprouts may accumulate heavy metals for the general benefit of the tree. They may be something more than parasites, and further genomic research could reveal the answer. It’s clear that the deeper we go into the redwood genome, the more we’ll know. And in conservation science — as with most things — knowledge is power. 

— Glen Martin

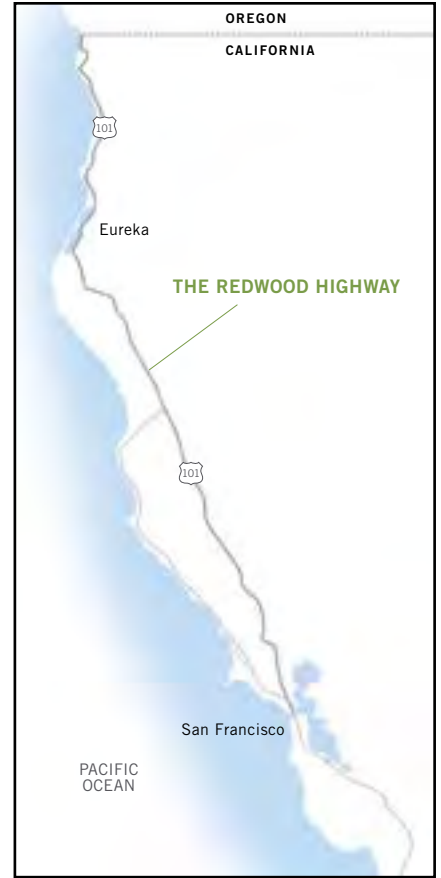
In Oakland’s Redwood Regional Park, coast redwoods grow around the stump of an ancient redwood harvested in the 1800s. Preliminary League-sponsored genomic inquiries have revealed that such groups of redwoods are not always clones, and that timber harvests can lower a forest’s genetic diversity for decades.







**STAND** FOR THE **REDWOODS**  
STAND FOR THE FUTURE



## THE HIGHWAY

THAT

# STARTED A MOVEMENT

Coast redwoods dwarf cars along The Redwood Highway in Humboldt County, California, around 1918. The redwoods' stunning beauty along this road spurred the establishment of Save the Redwoods League that year.

### WHAT

The Redwood Highway (today, the northern part of Route 101 in California) runs 370 miles north from the Golden Gate through the world's tallest ancient coast redwood forest. In 1917, the highway opened up the ancient Northern California redwood forests to more logging.

### LEARN MORE

[SaveTheRedwoods.org/history](http://SaveTheRedwoods.org/history)

In 1917, the head of the National Park Service, Stephen Mather, inspired the founders of Save the Redwoods League — prominent conservationists John C. Merriam, Madison Grant and Henry Fairfield Osborn — to investigate the state of the redwood forests in Northern California. They had heard the new Redwood Highway had opened up the area to more logging, threatening the ancient trees.

Along the Mendocino County coast, they passed long-standing logging operations that had already cleared most of the county's old-growth redwoods near coastal shipping harbors. Farther north and inland, along the Eel River, they saw practically undisturbed forests. As they continued north, they reached the Bull Creek-Dyerville Flat area in Humboldt County, an area dense with gigantic redwoods reaching more than 300 feet in height.

In the presence of such awe-inspiring beauty and serenity, Merriam, Grant and Osborn felt compelled to remove their hats and speak only in whispers. That evening, they agreed that a state or national park was needed to save some part of the North Coast redwood forest for future generations.

### 1918: SAVE THE REDWOODS LEAGUE IS FORMED

Grant worked with Merriam, Osborn, Mather and others to form Save the Redwoods League in 1918, beginning with donations totaling \$100. The League was one of the nation's first conservation organizations. In 2018, we will honor 100 years of conservation leadership with a year-long celebration and an ambitious vision for our next 100 years. With events, an exhibit, redwoods experiences and more, we will celebrate California's once and future forest, our state tree and our shared commitment to protect the redwoods. You can learn more in upcoming publications and on our social media channels. 🌿

Photos: this page by HC Tibbitts; facing page by Mike Shroyer.



# A Grove for *the Future*

**Opportunities available in 19 parks throughout Northern California**

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***Save The Redwoods***  
L E A G U E®

**Sharon Rabichow**

Director of Gift Planning

415-820-5828

[legacy@SaveTheRedwoods.org](mailto:legacy@SaveTheRedwoods.org)

[MyRedwoodsLegacy.org/grove](https://MyRedwoodsLegacy.org/grove)

You can help permanently protect and restore redwood forests, plus inspire the next generation of redwoods caretakers. By dedicating a grove today or by doing so in your will or trust, you make a personal commitment to these incredible and precious natural wonders while honoring or memorializing yourself or a loved one.

Please return the attached postcard to play an important role in the future of the redwoods.



## ASK AN EXPERT

### Q: Why is fire used to manage redwood forests?

Fire is a natural part of the environment and benefits many forests. Prescribed fires have long been used to encourage growth of beneficial and native plant species and reduce the amount of combustible vegetation that could fuel catastrophic wildfires. Thousands of prescribed fires are carried out across the country every year, and they are integral to forest restoration and stewardship. Coast redwoods are highly adapted to fire. Their thick bark and high canopies provide protection from the flames, and new seedlings establish in post-fire conditions. Throughout the redwood range, Native Americans frequently used fire to maintain hunting grounds and travel corridors, promote the growth of plants used for basketry materials, and sustain food sources such as tanoak acorns.

#### A LIKELY HISTORY OF FIRES

Many redwood forests likely experienced regular fires. The forest underwent dramatic changes over the last century because of logging and fire suppression. Today,

an important and developing restoration strategy is the reintroduction of fire and other processes that promote forest health. Prescribed fires can be used in previously logged, second-growth forests to meet restoration goals such as creating scars and snags where wildlife can live. These fires can open up growing space, placing the forest on the path to become the extraordinary old-growth forests of the future.

Prescribed fire requires collaboration from many organizations, careful planning and skilled practitioners. During a brief window in October 2016, many controlled burns were carried out on more than 2,800 acres of Redwood National and State Parks (RNSP) in Northern California. In the parks, prescribed fire is predominantly used as a management tool to restore and maintain prairie ecosystems and oak woodlands scattered throughout redwood forests. Every year RNSP has increased the capacity to use fire, and is developing more prescribed fire plans in redwood forests. —

— Andrew Slack



**THIS PAGE** The thick bark of coast redwoods and their high canopies provide protection from flames.

**FACING PAGE** In Redwood National and State Parks, prescribed fire is used to restore and maintain prairie ecosystems and oak woodlands scattered throughout redwood forests.

#### WHAT

Prescribed fires, also known as controlled burns

#### WHEN

Controlled burns are conducted in the spring and fall when weather conditions allow for lighter fires that are more easily managed.

#### THE EXPERT

Andrew Slack is working on restoration projects on the North Coast of California with League collaborators. Here, he explains the role of fire as a tool to care for redwood forests.

#### LEARN MORE

[SaveTheRedwoods.org/fire](https://www.savetheredwoods.org/fire)

#### DO YOU HAVE A QUESTION ABOUT REDWOODS?

Send your questions to us!

Email: [Redwoods@SaveTheRedwoods.org](mailto:Redwoods@SaveTheRedwoods.org)

Mail: Send a note to our address on the back cover

Phone: 415-820-5856

Prescribed fires can be used to create tree cavities for wildlife habitat, encourage growth of beneficial and native plant species, and reduce the amount of combustible vegetation that could fuel catastrophic wildfires.



The League celebrates  
the permanent protection  
of a quintessentially  
Californian place

# WANDERING A COASTAL WONDERLAND

Stewarts Point: A Photo Essay







On the magnificent League-owned property called Stewarts Point, the spectacular Sonoma County Coast and the mighty redwood forests are iconic elements of California's identity. And forever intertwined with these inspiring landscapes is the cultural richness of the Native American tribes that have lived for thousands of years along the coastal bluffs and forested waterways.

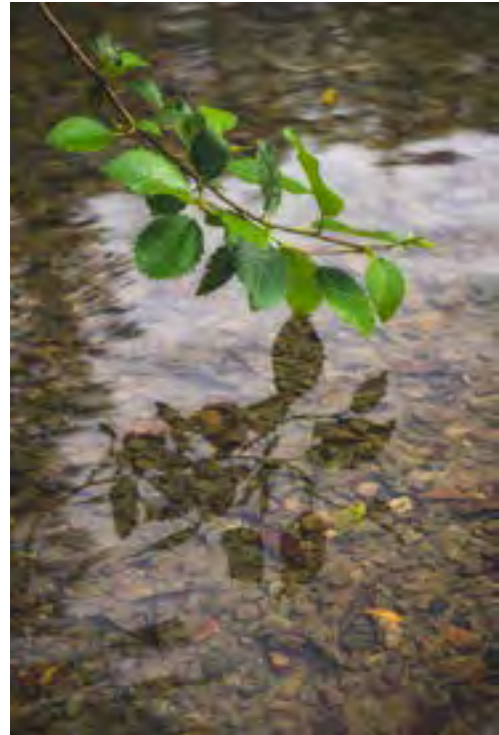
The League and our collaborators are celebrating this 870-acre property where nature and culture come together in one incredible conservation achievement, the permanent protection of Stewarts Point through an easement. Earlier this year, the League transferred the easement to Sonoma County Agricultural Preservation and Open Space District to conserve 700 acres of second-growth redwood forestland, more than 100 acres of coastal grasslands and 1.7 miles of the Gualala River. The transaction also included the transfer of an easement to the County of Sonoma for the development of a trail along the rugged coastline by 2019. Another agreement, a cultural access easement, is being finalized to grant the indigenous Kashia Band of Pomo Indians permanent access to their ancestral home for ceremonial uses.

### PERMANENTLY PROTECTED

In 2010, with the help of the Gordon and Betty Moore Foundation, donors from around the country and a loan from the David and Lucile Packard Foundation, Save the Redwoods League purchased the Stewarts Point property for \$11.25 million to stave off development and find a long-term conservation solution. The permanent protection of Stewarts Point was made possible by funds from the California Wildlife Conservation Board and the California Coastal Conservancy, and by California voters, who approved Proposition 84 in 2006. This bond measure supported projects related to watersheds, parks, forests and coastal access. Likewise, the voters of Sonoma County voted in 2006 to approve the Open Space District's bond measure, which funded the District's contribution for conservation of this treasured local resource.

Looking to the future, it is our goal to recover the old-growth forest characteristics lost over a century ago, with large, thriving redwoods present in all 700 forested acres. As part of the conservation plan, about 525 acres of the forest will be sustainably managed as a working forest that protects wildlife and streams — all while providing forest management jobs and benefitting the local timber economy. On the remaining 175 acres, old-growth stands will be protected along the Gualala River where restoration work may accelerate development of ancient forest features.

Here's a look at this treasured land. 



**THIS SPREAD** The permanent protection of Stewarts Point includes 1.7 miles of the South Fork Gualala River (LEFT), which bears threatened steelhead trout (ABOVE). Protecting habitat such as this stretch of river is a critical part of saving this species.

**PREVIOUS SPREAD** By the end of 2019, a public trail will traverse the dramatic coastal terrace for almost a mile, providing visitors with a gorgeous view. An easement will grant the Kashia Band of Pomo Indians permanent access to hold ceremonies on the bluff, overlooking the creation place of their people.





Old-growth redwoods along the Gualala River (FACING PAGE) are now protected as part of a 175-acre reserve, where restoration work may allow younger trees to grow larger and provide habitat for more species of plants and animals. In an area that was clear-cut around 120 years ago, these old groves are cherished. Sword ferns (BELOW) blanket the forest floor.

#### WHAT

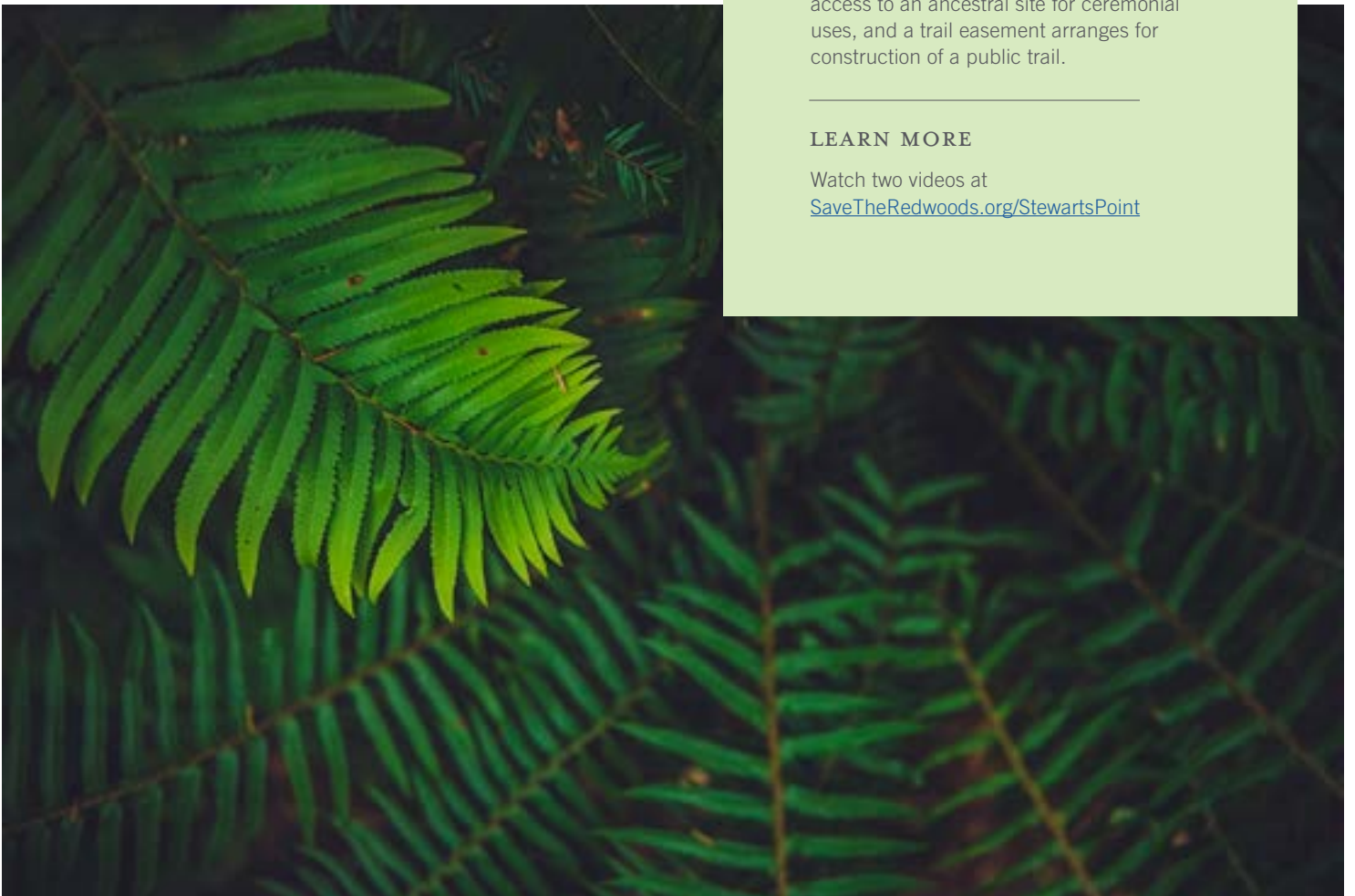
Stewarts Point, a property  
Save the Redwoods League owns

#### HOW

The League earlier this year transferred an easement, permanently protecting the property's redwood forest and a stretch of river. Another agreement will grant indigenous people permanent access to an ancestral site for ceremonial uses, and a trail easement arranges for construction of a public trail.

#### LEARN MORE

Watch two videos at  
[SaveTheRedwoods.org/StewartsPoint](https://www.savetheredwoods.org/StewartsPoint)



A photograph of a dense forest of tall redwood trees. The foreground is filled with vibrant green ferns and other forest floor vegetation. The trees are tall and slender, with thick, textured bark. The lighting is soft, suggesting a dappled sunlight filtering through the canopy.

# Writing of Wild Wonder

Redwoods Inspire  
Best-Selling Author



“I can still remember first seeing pictures of redwoods in a book when I was a boy. I was astonished that anything could be that big.”

T.A. Barron, best-selling author

#### WHO

T. A. Barron, a member of the Save the Redwoods League Council and author of more than 30 novels, children’s books and nonfiction nature books

#### LEARN MORE

Barron’s books include the *Merlin Saga* and *The Ancient One*.

T. A. Barron, a member of the Save the Redwoods League Council, grew up in rural Colorado, where his connection to nature was immersive and powerful. The lofty peaks, pristine streams, and expansive aspen and spruce forests of the Rocky Mountains constituted the backdrop to his youth and drove a lifelong commitment to conservation.

After studying as a Rhodes Scholar, Barron joined the business world, ultimately becoming a company president. But excelling in the corporate world wasn’t enough. He had always wanted to write, and in 1990 he decided to commit himself full time to his storytelling ambitions, leaving his business and moving back to his native Colorado.

Today, Barron is the best-selling author of over 30 novels, children’s books, and nonfiction nature books and the recipient of numerous literary awards. He serves on the Governing Council of The Wilderness Society, and he is the founder of the Gloria Barron Prize for Young Heroes, an annual award presented to 25 public-spirited youths.

#### DISNEY FILM IN PRODUCTION

Barron’s books include the *Merlin Saga*, now under development as a feature film by Disney, and *The Ancient One*, the story of a brave young girl who discovers a grove of ancient redwoods in a lost crater in Oregon.

Barron said the great trees inspire him as an enduring symbol of conservation and are a recurring and central theme in his work.

“I can still remember first seeing pictures of redwoods in a book when I was a boy,” he recalled. “I was astonished that anything could be that big. I didn’t get a chance to actually see them, though, until I was in college. I took a trip to California, and I visited Muir Woods. I was amazed, both uplifted and humbled at the same time. I looked up into the boughs of one of the biggest trees and thought of the stories it could tell if only it could speak. So in my own way, I’ve been trying to tell some of those stories.”

While conservation is based on science, Barron believes any successful effort to protect threatened systems such as the redwood forest ultimately must be founded on emotional connections.

“These days, I start my talks with an observation from Rachel Carson’s last book, *The Sense of Wonder*,” said Barron. “She said that before we can hear and understand the science, we must establish an emotional connection with nature. You have to get people out to hear the crickets chirping, smell the fragrant mountain air, and see the majestic redwood trees. That’s how they understand the stakes.” —

— Glen Martin



# World Treasure to Reopen

## After Multiyear Restoration

Yosemite National Park's  
Mariposa Grove of Giant Sequoias

Ancient trees touch the sky in Yosemite National Park's Mariposa Grove of Giant Sequoias. This fall, the grove is to reopen, featuring new, wheelchair-accessible trails and boardwalks and an interpretive display.



ABOVE A wheelchair-accessible boardwalk protects Mariposa Grove.

LEFT Mariposa Grove, photographed by a League researcher.

RIGHT John Muir and President Theodore Roosevelt (fourth and sixth from right) in front of Mariposa Grove's Grizzly Giant tree in 1903.

## YOSEMITE'S MARIPOSA GROVE TO REOPEN

Yosemite National Park is world famous for its spectacular glacier-carved valleys, sheer granite walls, lofty thundering waterfalls and the colossal trees in the Mariposa Grove of Giant Sequoias. So amazing are the sizes of the hundreds of giant sequoias that the grove sparked the conservation movement. During the dark times of the Civil War in 1864, President Abraham Lincoln signed the Yosemite Grant Act, protecting the ancient grove and Yosemite Valley for public recreation. This act was the first in our nation's history to set aside scenic natural areas for future generations, predating the establishment of our national park system.

Still, the decades since haven't always been kind to this national treasure. Infrastructure interfered with natural water flow to the grove's trees, and erosion from construction and road use compacted the soil and injured and damaged roots of even the most formidable giant sequoias.

## RESEARCH IN PROGRESS

In 2014, the National Park Service, with support from Save the Redwoods League and the Yosemite Conservancy, started to restore the park's largest sequoia grove to its former glory. Our Redwoods and Climate Change Initiative researchers have been studying the great grandfather trees, scaling their colossal trunks, mapping their labyrinthine crowns, and chronicling their growth history through first-ever core samples collected in the forest canopy. One of their discoveries was a 120-year-old pine growing out of a burnt-out pocket high in the canopy! Researchers will share their findings soon.

The grove is expected to reopen this fall. In addition to red giants standing higher than a 30-story building, visitors will find new, wheelchair-accessible trails and boardwalks; roads converted into hiking trails; a transit hub; and shuttle service. A new interpretive display will feature a cross section of trunk from an 805-year-old giant sequoia that fell in the grove in 1954. From this sample, scientists learned that a fire occurred in the grove in 1580, and another in the late summer of 1728. In all, the grove restoration would make President Lincoln proud. —

— Dana Poblete



“It took more than three thousand years to make ... trees that are still standing in perfect strength and beauty, waving and singing in the mighty forests of the Sierra.”

Conservationist John Muir, describing giant sequoia. He helped inspire the establishment of Yosemite National Park.



## VISITING MARIPOSA GROVE

### HIGHLIGHTS

Grizzly Giant, 1,800 years old, 30 feet wide (the length of two cars); Faithful Couple, two large trees fused at the base; Clothespin Tree, in which many fires have excavated a natural tunnel wider than a car.

### TRAILHEAD LOCATION

2 miles from Yosemite's south entrance off California State Route 41

### TRAIL LENGTHS

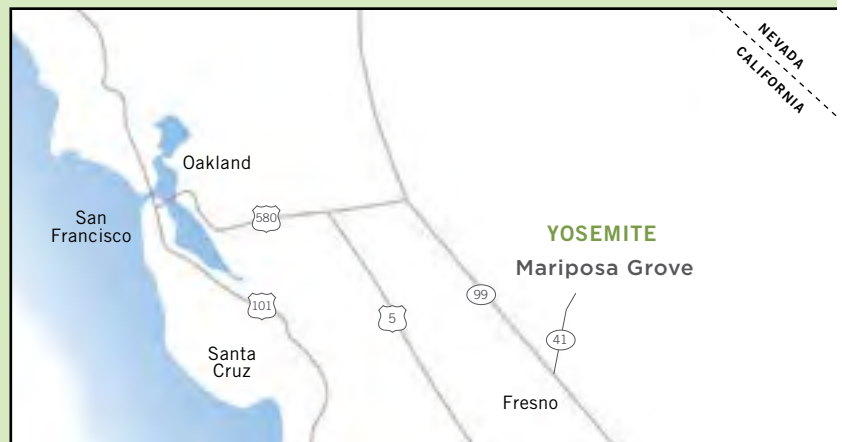
Wheelchair-accessible trails: 0.75 mile. Round-trips: Grizzly Giant loop, 2.2 miles; lower and upper grove areas, 5-6 miles

### ELEVATION GAIN

As much as 1,200 feet in the upper grove.

### HIKING TIME

1-4 hours



### BEST TIME TO VISIT

Year-round. The lower grove is crowded in the summer, and roads will close intermittently in the winter, depending on snow.

### LEARN MORE

To see when the grove will reopen this fall and to plan your trip, visit Yosemite National Park's website at [nps.gov/yose](https://nps.gov/yose), or call the park at 209-372-0200.



# You Can Protect

## THE HOME OF AWE

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### YOUR GIFT WILL SUPPORT URGENT WORK IN THESE SPECIAL PLACES

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Now is a great time to renew your membership to help California's iconic coast redwood forest and giant sequoia groves of the Sierra Nevada. Your tax-deductible contribution supports the work of Save the Redwoods League in these awe-inspiring places.

*Save The Redwoods*  
LEAGUE®

For more information or to donate, visit our secure site, [SaveTheRedwoods.org/Magazine](https://www.savetheredwoods.org/Magazine) or call us at 888-836-0005.

#### **PROTECT**

You can help protect redwood forests from threats including subdivision and development.

#### **RESTORE**

You can help restore young redwood forests, setting them on the path to become ancient forests for future generations.

#### **CONNECT**

You can help connect people to the peace and beauty of the forest in world-class parks.

# YOUR REDWOODS STORY

SHARE WHY YOU STAND FOR THE REDWOODS

**Save the Redwoods League is turning 100 years old in 2018!** We invite you to share why you stand for the redwoods, as well as your dreams for the forest's next 100 years. Your contributions could appear in upcoming issues of this magazine.

How to send us your story:

- Post your thoughts and images on our social media ( [f](#) [t](#) [i](#) [l](#) [p](#) [v](#) ) and tag them with **#Stand4Redwoods**.
- Email notes and photos to **Redwoods@SaveTheRedwoods.org**.
- Mail your story to our address on the back cover. We cannot return items, so please send a copy we can keep.

**STAND** FOR THE  
**REDWOODS**  
STAND FOR THE FUTURE

100 YEARS IS JUST THE BEGINNING

*Save The Redwoods*  
LEAGUE®



*Here's what a few of our Redwood Legacy Circle members have to say on the eve of our Centennial. These members have generously named the League in their wills or trusts.*

## WHY I STAND FOR THE REDWOODS

California redwoods are something to behold. Sheer awe. It's the most healing experience you can find. It just makes you tingle.

— Ed Gilbert

Redwoods make people feel centered and connected to the planet. The length of time they've been standing — they are a testament to the past.

— Rose Marie Cleese

## MY DREAMS FOR THE REDWOOD FOREST'S NEXT 100 YEARS

I hope for significant restoration of the redwood forest throughout Northern California. I hope for places where people can go and have the serenity and solitude that they seek.

— Candace Walker (LEFT)

I would like to think that if you come back to the ancient forest 100 years from now, it'll look and feel just like this.

— Mary Topliff

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# WELCOME

to the inaugural issue of **REDWOODS** magazine

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We are thrilled to introduce you to **REDWOODS**, the new magazine of Save the Redwoods League. In this publication, we celebrate our efforts to protect our magical redwood forests; we connect our community to our next era of work; and we showcase the latest redwoods news so that we all can make informed decisions on behalf of these magnificent places.

We are interested to hear your feedback about **REDWOODS**. Please complete a short survey at [SaveTheRedwoods.org/Redwoods](http://SaveTheRedwoods.org/Redwoods) for a chance to receive our new, insulated stainless steel water bottle. Thank you!

*Save The Redwoods*  
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