A Season of Change

Asserting our right to care for this world
This fall, I was working with my team to film a series of videos for an innovative program with the Long Beach Water Department (LBWD). LBWD was one of the first water authorities in the country to enact lawn-to-garden rebate programs; now they’ve asked CNPS to help replace the city’s grassy parkway strips with native plants. Imagine that: neighborhood streets in an entire city lined with native plants instead of lawn.

Replacing water-thirsty turf with our native buckwheats, yarrows, and bunchgrasses is about more than landscaping. There’s a sense of making things right. Our native plants were here long before those sidewalks and 20th century suburban gardens; now, we’re welcoming them back. It’s a simple but profound act that honors this place we call California, one that feels especially important as we celebrate Indigenous Peoples’ Day in October.

The people, the landscapes, and the plants that have defined our home state for millennia aren’t just of the past, but of the present – and of the future.

In California, at the United Nations headquarters in New York City, and in #ClimateStrikes across the world, new generations are coming together to assert our right to care for this planet and fix what’s broken, a right that belongs to all of us together, not just the powerful alone. This issue of *Flora* is a celebration of that momentum.

On the following pages, we’re proud to include a conversation with author Sanjay Bavikatte, an environmental attorney and international expert on biocultural rights. Bavikatte calls for solidarity with Indigenous peoples worldwide who are fighting for the right to care for their homelands, not just because it’s the right thing to do, but because it’s a necessity. Biodiversity is a common good, and the environmental impacts we’re experiencing are due to global forces that transcend borders. Seen in that light, he says, your local actions can help support international obligations.

I’m heartened to see this at work in California. The individual hiker who defends an endangered species (page 3), the working groups figuring out how we protect our natural resources to sequester carbon (page 17), the artists inspiring us to protect the beauty we have left (page 22), and the botanist mountain bikers building bridges between communities (page 24) – all of them and each of us add to the positive change bringing new hope. Not one of us can do it alone, but together we can contribute to something bigger than ourselves, get out of our comfort zones, and be changed for the better in so doing. As Bavikatte says in his interview, “I think we need the kind of cosmovision that Indigenous peoples are talking about – to not only seek to transform things outside of ourselves, but to also allow ourselves to be transformed by them.”

May this changing season work its magic . . .

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ON THE COVER: Ponderosa pines (Pinus ponderosa) stand in contrast to the deciduous quaking aspen (Populus tremuloides) of California’s Eastern Sierra. Photo by Nita Winter and Rob Badger, photographers of the upcoming CNPS-Winter Badger Press book, Beauty and the Beast: California Wildflowers and Climate Change.

ABOVE: Fall comes quickly to the Eastern Sierra with the quaking aspen (Populus tremuloides) seeming to change overnight, says Jeff Bisbee, who took this photo.
In The News

GOOD NEWS IN THE DESERT

In a victory for desert habitat, the Riverside County Planning Commission voted against the Paradise Valley Specific Plan on August 21. With a 4-1 vote, the commissioners recommended the county’s board of supervisors deny the project, which proposes to build an 8,490 home city at the southern border of Joshua Tree National Park.

The Riverside County commissioners pointed to the Paradise Valley project’s inconsistency with the Coachella Valley Multiple Species Habitat Conservation Plan, the lack of alternate access routes for use in emergencies, and an inadequate percentage of affordable housing, as some of their primary concerns.

“We are now just one step away from defeating a massive leapfrog development that would threaten wildflowers, microphyll woodland habitat, and desert tortoise,” said CNPS Southern California Conservation Analyst Nick Jensen. Later this fall, the Riverside County Board of Supervisors will hold a final vote on the project. In the meantime, CNPS and partners will continue their advocacy to ensure this paradise remains unpaved.

Above: The proposed site of the Paradise Valley development. Photo: Nick Jensen

Below: CNPS Board President Steve Hartman congratulates a surprised Brett Hall.

CNPS Awards New Fellow Brett Hall

Long-time CNPS leader and cherished mentor to many, Brett Hall is the newest CNPS Fellow. CNPS honored Hall during the September CNPS Conservation Symposium at the UC Santa Cruz Arboretum. Hall built his career at the arboretum, helping to establish it as one of the world’s most respected collections of Mediterranean plants. He currently serves as the arboretum’s Director of the California Native Plant Program. A member of CNPS for more than four decades, Hall has served multiple terms on the CNPS board of directors, including a term as board president from 2009-2013. He’s been a dedicated leader of the CNPS Santa Cruz Chapter and helped found the CNPS Tahoe Chapter. Hall is also recognized for his ongoing work with college students and California Plant Rescue. Fellow CNPS Board Member Vince Scheidt calls Hall, “a hard-core native plant enthusiast – one of the most driven I have ever met.”

Read more about Hall and recent CNPS Fellows Julie Evens and Celia Kutcher in the upcoming winter issue of *Fremontia*. 
**In the News**

A simple summer hike revealed an unfortunate discovery for the federally endangered Braunton’s milk-vetch (*Astragalus brauntonii*). In early July, CNPS member David Pluenneke was walking through Topanga Canyon State Park when he noticed that a newly graded road stopped just a few feet from a group of the milk-vetch.

Nearby, he also saw a sign indicating the Los Angeles Department of Water and Power (LADWP) was replacing wooden utility poles in the area for wildfire prevention, so he emailed the agency’s offices to notify them of the rare plant population. A week later, Pluenneke returned to the same Topanga Canyon spot to find that the bulldozing had resumed, straight through the milk-vetch plants he’d observed the week before. “It’s hard not to think that if there had been blue whales and panda bears up there, they would have bulldozed them, too,” Pluenneke told the *Los Angeles Times*, one of multiple media outlets to cover the story.

Officials are now investigating LADWP’s actions. They will also determine how to mitigate for the impacts to Braunton’s milk-vetch. The LADWP project is one of many urgent wildfire prevention projects underway statewide. CNPS universally supports efforts to modernize utility infrastructure for wildfire prevention, but emphasized the need to work with state and local agencies to minimize harm to sensitive species and habitats as that work is completed.

“This is a loss that just didn’t need to happen,” CNPS Southern California Conservation Analyst Nick Jensen said. “Projects like these should be accompanied with botanical surveys to avoid impacts to rare plants and fragile habitats.”

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**Astragalus in Trouble**

A simple summer hike revealed an unfortunate discovery for the federally endangered Braunton’s milk-vetch (*Astragalus brauntonii*). In early July, CNPS member David Pluenneke was walking through Topanga Canyon State Park when he noticed that a newly graded road stopped just a few feet from a group of the milk-vetch.

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“This just didn’t need to happen. Projects like these should be accompanied with botanical surveys to avoid impacts to rare plants and fragile habitats.” — Nick Jensen

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Top: Endangered species meets bulldozer in Topanga Canyon. Photo: David Pluenneke, Above: Braunton’s milk-vetch (*Astragalus brauntonii*). Photo: Mickey Long
Protecting California’s native plants is about more than plants.

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Humbolt’s lily (*Lilium humboldtii*). Photo: Elizabeth Kubey
Just in time for Halloween, we’re getting into spooky spirits with this fall’s theme: parasitic native plants. A parasitic plant gets some or all of its nutrients from another living plant or fungi. These plants have a specialized structure called a haustorium, that creates a physical link between the parasite and its host. The haustorium can occur on the plant’s stem or on its roots. Here are a few of the CNPS plant science team’s favorite native parasitic or hemi-parasitic (partly parasitic) species.

**Chaparral dodder** (*Cuscuta californica*)  
Family: Convolvulaceae  
Common hosts: many plants  
Habitat: grassland, chaparral

**Desert Christmas tree** (*Pholisma arenarium*)  
Family: Boraginaceae  
Common hosts: Shrubs like burrobush, yerba santa, and rabbitbrush  
Habitat: desert, chaparral, coast

**California groundcone** (*Kopsiopsis strobilacea*)  
Family: Orobanchaceae  
Common hosts: manzanita and madrone  
Habitat: open woodland, chaparral

**Oak mistletoe** (*Phoradendron leucarpum*)  
Family: Viscaceae  
Common hosts: oaks and hardwoods  
Habitat: throughout California

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Our Cool California Natives column has a new look! With this issue, we’re shifting our focus from seasonal plants to fun plant themes for all ages.
Above: California riparian plants turning to gold at Silver Lake in El Dorado County. Pictured here: sedges (Carex sp.) and willows (Salix sp.) at the water’s edge. Photo: Rob Badger and Nita Winter

Left: The California buckeye (Aesculus californica) is the only buckeye native to California and an important habitat plant for insects and birds. Although it is sometimes referred to as a “horse chestnut,” its fruit is toxic. Photo: Ger Erickson
Fall is here, and the the riotous energy of spring and long days of summer are past. Now a hike in the Sierra or along a riparian trail feels quieter, maybe lonelier, possibly sweeter. In the hush of settling leaves and creatures, nature welcomes each of us into its ever-changing rhythm.

In this issue, we celebrate the season with fall photos of our native California landscapes. We’re especially grateful to photographers Rob Badger and Nita Winter, Jeff Bisbee, and Ger Erickson. Jeff takes us on a visual tour of the Eastern Sierra’s stunning fall display; Ger documents the warm beauty of Contra Costa County in fall; and Nita and Rob give us a taste for the talent they showcase in their upcoming book, *Beauty and the Beast: California Wildflowers and Climate Change*. (Learn more on page 22.)

Wherever you are, we hope you’ll pause to take in the color and gentle reminders this season has to offer.
California’s Eastern Sierra and adjacent mountain ranges are remarkable places to take in dramatic fall color, thanks to concentrations of quaking aspen (Populus tremuloides) and dramatic topography. But that’s just the beginning of what this special region has to offer. Mono and Inyo counties are home to largely intact habitats that provide an important transition zone between the highest peaks in the continental U.S. and desert habitats to the east. Here, you’ll find everything from ancient bristlecone pine (Pinus longaeva) and alpine rock gardens to alkali flats and sand dunes.

“...

In the Eastern Sierra, fall change comes very quickly. It seems like overnight, whole hillsides of aspens become ablaze with color.”
— Photographer Jeff Bisbee
Above: Mighty valley oak (*Quercus lobata*) tower over a frosty working grassland. Photo: Ger Erickson

Left: Reminiscent of spring’s wildflower blooms across desert hillsides, quaking aspen (*Populus tremuloides*) blanket the austere Sierra slopes in Mono County. Photo: Jeff Bisbee

Below: Sedges (*Carex* sp.), willows (*Salix* sp.), and creek dogwood (*Cornus sericea*) ring a quiet lake in Yosemite National Park. Photo: Rob Badger and Nita Winter
The subdued colors of sagebrush (Artemesia sp.) at McGee Creek in Mono County. Photo: Jeff Bisbee
“Human life is deeply intertwined with the flourishing of the ecosystem in which people find themselves. To care for it is natural.

Stewardship is a Human Right

A conversation with Sanjay Bavikatte on solidarity and the environment

BY DAN GLUESENKAMP

For years, I have felt there is a jarring discordance in conservation, between our personal feelings and our public communications. Personally, we’re all drawn to this work by a feeling of love for wild places and special species. Our work focuses on saving that which most enchants us. We work to exhaustion, not just to save what we cherish, but also because it makes us feel personally fulfilled and of value to our broadest community.

But those compelling and very human motivations feel increasingly crowded out by pressure to justify our deep love for the natural world in transactional terms. Rather than a field of wildflowers or clean mountain spring being of inherent value, we must demonstrate the ways in which they support our economy, providing limited but quantifiable value in the form of “ecosystem services.” It’s a lens that quickly grows tedious and loses sight of what actually motivates people to act.

A year ago, I wouldn’t have had the words to explain why I disagree with that approach. I would have said that if we listen instead of talk, we’d hear that people already love nature, butterflies, and flowers – not because they underpin ecosystem services, but because we all resonate and share a fundamental love for living things. Before reading works like Sanjay Kabir Bavikatte’s, Stewarding the Earth: Rethinking Property and the Emergence of Biocultural Rights, I wouldn’t have had the language.

“Human life is deeply intertwined with the flourishing of the ecosystem in which people find themselves. To care for it is natural.”
I wouldn’t have known that there is a movement out there: anthropologists and legal scholars who have studied “neoliberalization of conservation,” and explored the harm done by defining conservation value in strictly market-oriented terms.

I feel biocultural rights are at the core of the CNPS ethos, that we are driven not by the economics of gain but rather by a hunger to contribute. I believe kinship with non-human life more accurately describes our motivation than do economic models. And so I asked Sanjay to talk with me about these ideas and share his perspective with Flora readers. I hope you enjoy the result and welcome the continued discussion.

Sanjay, you work on biocultural rights, especially within the context of the United Nations Convention on Biological Diversity (CBD). What are biocultural rights and how are they essential to biodiversity protection?

‘Biocultural rights’ speaks about the right to stewardship, and the right to care for, tend, and nurture landscapes and seascapes. This is something that communities in different parts of the world have done for many generations, and something that only recently is becoming recognized in law. Indigenous peoples now have the United Nations Declaration on the Rights of Indigenous Peoples, adopted in 2007, that articulates a variety of rights to self-determination, including the right to care for their landscapes and seascapes. Much of the activism around this came out of the UN Convention on Biological Diversity, where the push was to recognize the rights of traditional stewards to govern and manage their territories.

In the US environmental movement, the ‘tragedy of the commons’ was one of the seminal concepts. Tragedy of the commons assumes that common resources are going to be harmed because people will act only out of their own self-interest and therein spoil them. The work you’re doing comes from kind of the opposite perspective. Indeed. It does. The term ‘tragedy of the commons’ was coined by Garrett Hardin. Essentially it was based on the idea that human beings are rational maximizers of self-interest.

But you — and others — find evidence of humans behaving in a different way. Can you explain that?

Yes. So if you had a group of people who were collective users of a shared resource, each individual would maximize what they could take, which would lead to a collapse of the resource. This was disabused by Eleanor Ostrom, who won the 2009 Nobel Prize in Economics saying, ‘This whole idea is patently false and doesn’t take seriously thousands and thousands of examples across the world where communities have effectively managed and governed shared resources.’ Virtually every region of the world has countless examples of this. The heart of this is stewardship, the understanding that human life or community life is deeply intertwined with the flourishing of the ecosystem in which people find themselves. To care for it is natural. People’s natural inclination is to work together to conserve and share.

Can you talk more about the rights of Indigenous peoples (and all people) to exercise custodial duties in the absence of title or possession? This is about taking care of places that we don’t own or maybe even that shouldn’t be owned by anybody. It’s something that’s at the heart of what CNPSers do: They take care of
places, save species from extinction, teach biodiversity gardening, and spend weekends on someone else’s land stewarding it. There is another kind of ownership, beyond holding title to the land, that we all sense. Can you talk about how this connects to our personhood, and what happens to us when we lose it?

This becomes an interesting question because of certain myths that we believe in. For example, we tend to view property as a thing instead of a right. Property is a right. It’s not a thing. Things are just things. When you say, ‘This is my property,’ it’s an exercise of a right. Just because I own the plot of land on which my house is in Oakland, it doesn’t mean I have the right to drill for oil there. Now, in the context of CNPS, this is an exercise of the right to stewardship. A piece of land may not necessarily belong to a steward, they may not have legal title. It could be government land or it could be private land. But they care for it and they care for species that are on it. This is the kind of tension that we are all experiencing because we are living at a time when species loss doesn’t only affect the property owner but it affects everybody else: plants, the air, clean water, etc. They all are public goods.

All these negotiations, whether it’s the Paris Agreement, the UN Framework Convention on Climate Change, or the Convention on Biological Diversity, say there’s a global commons to some extent. There is an existential question that confronts humanity as a whole at this point in time, and this is something that’s been reinforced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which recently said that over a million species are now in danger of extinction. Biodiversity itself becomes public good to some extent.

Co-Management in California
PHOTOS AND CAPTIONS BY CHARLES STRIPLEN

Under the watchful gaze of 2000-plus-year-old redwoods (the very same individual trees described by the Portola Expedition in October of 1769) at the ancient site of Mitinne (main town of the Quiroste) – a cadre of Native researchers, non-native scholars and park staff, tribal volunteers, and watershed neighbors simultaneously prep the ground for study and restore it to a more productive condition. Having undergone decades of benign neglect, this historic Quiroste village was overrun with brush and invasive conifers, and in 2003 became the site of more than a decade of study and stewardship under the leadership of members of the region’s original people. Science and traditional knowledge worked in parallel to understand this watershed area under an Indigenous management framework – largely focusing on the use of fire to maintain a productive coastal ecosystem. This research now serves as the basis for management of this new State Cultural Preserve.

Right: Jasmine Gonzales, an enrolled member of Dry Creek Rancheria (Southern Pomo), keys out soils from a portion of the Quiroste site using a Munsell soil chart.

Left: State Park and AmeriCorps staff clearing coyote brush and poison oak from the Quiroste Valley floor, where later the team would employ remote sensing technologies of resistivity, magnetometry, and ground-penetrating-radar to map the sub-surface features of the historic village. Historic archaeological practices would have dictated that this site be systematically “trenched” in order to understand it. Modern archaeology, with Tribal oversight, demands that every technology and approach designed to minimize site disturbance be employed.
I love the way this connects biodiversity and cultural diversity and shows they’re intimately related. It reveals that places have an array of rights: a place may be bound by property rights of the owner, while also carrying stewardship rights for communities, the rights of peoples to define themselves in terms of their ancestral place, and even the rights of all humankind to maintain a functioning biosphere. All of a sudden, a piece of land becomes so much richer and more complicated!

Indeed. As you start looking at it you see more than just one flat set of rights. There are multiple dimensions. And once you expand those dimensions you see multiple dimensions of solutions for some of the problems that are posed by just one-dimensional property rights.

Your book talks about a growing literature and science around our collective estrangement from nature. You say that ‘well-being has been replaced by well-having.’ How did you start working on these things? How did you come to realize this was important and something that you wanted to address?

I started out as a human rights lawyer, doing civil liberties work. My work led me to interface with Indigenous peoples, in a South African context where I slowly began to realize that there are entire groups of peoples for whom individual rights are imbricated deeply in their relationships with nature, in their relationships with land. These people were asking a fundamental question, ‘What does it mean to be human?’ They saw who they were as people not so much as sealed entities but as nodes in a web that was interconnected. And what they were fighting for was that interconnectedness as opposed to a sense of uniqueness. That was an important thing. It gave me an opportunity to use environmental law as a way of reinforcing basic human rights.

I like that you use the word ‘imbricated,’ which is also a botanical term. So we’ve touched on the United Nations Convention of Biological Diversity, and you helped negotiate the Nagoya Protocol on Access and Benefit Sharing. Can you talk about how you see cultures and NGOs like CNPS being able to use them in domestic activism going forward?

The Convention on Biological Diversity treaty came to life in 1992. Perhaps the most seminal environmental treaty in the world, signed by all UN member states — with the exception of the United States — it emphasizes conservation of biodiversity, sustainable use, and equitable sharing of benefits. I wasn’t around in negotiating the Convention, but I was definitely involved in including the Nagoya Protocol. I saw my role as expanding and clarifying the obligation of states to protect the lifeways of Indigenous peoples and local communities integral to conserving and sustainably using biological diversity. Article 10c and article 8j.

My involvement with the Convention was to clarify these lifeways, these rights. I felt that was really, really important. Now we’re in a place where all this is fairly ubiquitous, some of the conversation we’re having now we take it a bit for granted. We don’t realize that it is a result of many, many years of activism. Going forward the point is to constantly expand and clarify the scope of this and to really use it well. I think the danger is to think that just because it’s on paper that’s the endpoint. The fact that we have it on paper as a constitution in some sense is a really important milestone. But the other part is about how we effectively implement it.

Okay. So, staying on the focus on the UN Convention, as our ambitious new California Biodiversity Initiative grows and achieves successes here in California, we specifically intend to leverage those successes to advance global biodiversity protection at the UN meetings in 2020. What guidance would you share with this growing California team, given your experience in these kind of negotiations? How should we be thinking about the larger context as we focus on saving California?

I think California has been leading the effort to say that you don’t need the federal government to take action, subnationals like states can act on their own. If California can say, Okay, what are our obligations under the Convention of Biological Diversity? What are US
obligations under the UN Declaration of the Rights of Indigenous Peoples?’ And then say, ‘What then can local actors do to uphold these obligations?’ I think that’s a great way to do it because local initiatives are where the rubber meets the road, where the real difference happens in terms of landscapes and ecosystems. I think it’s helpful for your volunteers and members to see the work they’re doing and see themselves as part of a larger movement across the world, fundamentally helping with the enforcement of international obligations.

Last summer, California Gov. Gavin Newsom issued a formal apology to California tribes on behalf of California, for what is now officially recognized as genocide. At the same time, Brazil’s Bolsonaro has been making headlines for waging war against the Amazon, where his policies are devastating Brazilian First Nations along with the forests they’ve occupied for millennia. This contrast, between developed California now apologizing for genocide and Brazil embarking on the same course is stunning. We have to stop it, but how do developed countries say, ‘Don’t do what we did. We have all the money and power now but we did it wrong.’ It seems like that’s an obstacle to us being able to really be righteously outraged, and I wonder what your thoughts are on wealthy countries preaching to developing countries, and how we move forward in recognizing the rights of countries to develop, but without destroying our history and our future?

Today, what is very important to acknowledge is that we are confronting an existential question for the whole of humanity. Nobody is exempt from this. Within the next 11 years, if we are not able to limit greenhouse gas emissions and stop temperature increases, then all bets are off. So I think some of these debates become academic. I think the reality isn’t so much about the “First World” versus the “Third World,” because there are First Worlds in the Third World and Third Worlds in the First World. It is really important to acknowledge that there are social movements, and there are people, that are fundamentally challenging a certain development paradigm which sees nature as a resource to be exploited or to be consumed. And it doesn’t matter whether one is in China or in India or in the United States.

In the context of what you tell Bolsonaro’s government, one has to stand with the Indigenous tribes in the Amazon. It’s no longer about geographic borders anymore because essentially none of us are safe if the Amazon is destroyed. It affects everybody. That was the reason for the Convention on Biological Diversity, the UN Framework Convention on Climate Change, the UN Declaration of Rights for Indigenous Peoples — to say that whether we’re living in the US or whether we’re living in Brazil, our fates are indelibly linked and we sink or swim together. Of course, the impact on wealthy people in the United States may be slower than the impact for the Indigenous or rural communities living in the mangroves of Bangladesh, but the fact is that everybody will be affected.

This is the time for solidarity, this is a time for broad social movement, this is the time for backing Indigenous people. This is also a time for backing the environmental movement. Many European countries are taking the stand now, and I feel that the US should also fall in line. The impact is highly local, whether it’s forest fires or massive heatwaves, but the impacts you experience are due to global forces that transcend national boundaries. So action has to be global in nature.

I’ve been reading about the ‘neoliberalization of conservation,’ the increasing dominance by a worldview that sees conservation value in economic terms. For example, we must save species because their genes are the engineering material we need to be able to live on planet Earth in the future; we have to save ecosystems because they clean air and water and store carbon. You write about a multidimensional universe of worldviews, each a distinctive ecosystem of potential solutions, and the danger of flattening this to a single dimension of solutions. You make the point that, by saving cultures that look at the world in different ways, it gives us access to a lot more potential solutions. Can you talk a little bit about how we might break free and discover a richer ecosystem of ideas and solutions?

The point ultimately comes down to relationships. If we understand our relationship to each other or to non-human species as fundamentally instrumental, and say, ‘What can I get out of this for myself,’ then we fall back into the same trope that got us into this problem in the first place: that we are rational maximizers of self-interest. We are pushing forward to step away from this radical
The next (and oldest) frontier for carbon sequestration

California is on an ambitious path to build a climate-resilient, carbon-neutral California by the year 2045. But how is that accomplished?

Most people are familiar with common tactics for reducing carbon emissions, such as solar energy, electric cars, and LED bulbs. California is fortunate to also have a huge natural resource to help “sink” and store the carbon: its native plants and soils. Experts are focused on how to simultaneously preserve those natural resources while optimizing their carbon-storage capabilities.

In 2005, California set a target of reducing its greenhouse gas emissions (GHGs) to 40 percent of 1990 levels by 2030, and 80 percent of 1990 levels by 2050. In 2018, California upped the stakes by setting the goal of becoming carbon-neutral by 2045. Since even a target of 80 percent by 2050 won’t get us to carbon neutrality, we need
to look for additional ways to reduce GHGs to make our 2045 goal. Carbon modeling experts estimate that California’s forests, grasslands, and deserts could help the state achieve those additional reductions.

CNPS has joined with a broad coalition of stakeholders urging the Newsom administration to make up the difference by increasing carbon sequestration and storage on the state’s natural and working lands.

The challenge, of course, is a global one. In August, the Intergovernmental Panel on Climate Change published its special report on climate change and land that warned the world must change how it produces food and manages land in order to keep global temperatures at safe levels. The IPCC notes that the way humans use land is in part responsible for climate change, and these same lands can be part of a climate solution: “Conversion of natural land, and land management, are significant net contributors to GHG emissions and climate change, but land ecosystems are also a GHG sink.”

Greg Suba, conservation program director for the California Native Plant Society, says a focus on climate-mitigating carbon sequestration is somewhat new for CNPS. The organization has long supported actions that can reduce the impacts of climate change, with emphasis on efforts that reduce emissions without harming native habitats. One example: advocating for solar projects on rooftops and above parking lots, rather than on undisturbed land.

By contrast, carbon sequestration by forests and grasslands sometimes involves active management interventions on these natural lands. California’s challenge will be to identify where such interventions provide the greatest carbon benefit with the least impact to native biodiversity. For some natural lands, active interventions can be beneficial. For others, like intact desert lands, the message remains more simple. “Just leave them alone, and avoid unintended consequences,” Suba summarizes.

Policymakers are looking at the carbon sequestering potential of plants and soil with new urgency. The California Natural Resource Agency, the California Environmental Protection Agency, and the state Department of Food and Agriculture are working on

“We’re laying down the tracks as we move forward, and the climate-resilient California train is full speed ahead. Ways to create policy around this concept. But to do this, California needs to come to an understanding of how much carbon already is stored — and the various ways it might be sequestered, stored, and released. “That’s Step 1: An accurate carbon accounting,” Suba says. It’s work that dovetails with vegetation mapping, an area in which CNPS scientists are already leading.

In theory, after that carbon “budget” is established, Step 2 is to determine how the state can preserve its big “carbon sinks” and storage areas, and increase them into the future, Suba explains. This step then involves evaluating and refocusing management practices for the state’s natural, agricultural, and urban lands.

“In reality its messy,” Suba says. Both steps are occurring simultaneously, as working groups race to address the state’s goals in real time. “We’re laying down the tracks as we move forward, and the climate-resilient California train is full speed ahead.” CNPS, along with other non-governmental organizations that advocate for plants and wildlife, sustainable agriculture, and urban green space, are pushing hard for ambitious carbon-sequestration targets. “We are working together to address both a better carbon accounting for California, and what to do or not do on forests, grasslands, deserts, shrublands, wetlands, agricultural lands, and even urban greenspaces,” he says.

Mid-elevation alpine meadow among Jeffrey pines (Pinus jeffreyi) in the Transverse Ranges. A mix of grasses and sedges. Photo: Seth Kauppinen
Grasslands: Do no harm

California’s grasslands are a potential piece of the solution to carbon sequestration. They are part of California’s natural lands or working lands. Working lands include farms, ranches, and urban greenspaces. Of particular interest to CNPS regarding carbon sequestration is the Healthy Soils Program (HSP), part of the California Department of Food and Agriculture’s Healthy Soils Initiative. The Newsom administration is fully invested in the program, which started under Gov. Jerry Brown and has received more funding each year, up to $28 million in the current budget.

The HSP has two components: the Incentives Program and the Demonstration Projects. The Incentives Program pays farmers and ranchers for conservation efforts that improve soil health, sequester carbon, and reduce greenhouse gas emissions. The Demonstration Projects showcase the farmers’ and ranchers’ implementation of HSP practices.

Under one part of the Incentives Program, a farmer can get a grant to help bring in compost that was produced under defined conditions and transported a limited distance, thus with a small carbon footprint, Suba says. The compost is spread no more than 1/4-inch-thick over untilled soil, and is hoped to result in benefits such as improved soil water retention and increased carbon sequestration by soil microbes and resident plants. In some cases, the farmer can sell carbon credits related to increased carbon sequestration via California’s cap-and-trade program, potentially bringing in more income and helping farmers and ranchers keep their lands in the family business rather than selling and converting them for development. Ranches and farms are limited to participating in the program once every three years.

The appeal of compost applications (one of many tools in the “Carbon Farming” toolkit) lies in the hope that treatment can enrich soils, improve water storage, and ultimately sequester carbon. It also provides a use for the volumes of compost generated from green waste at municipal landfills. But there are questions still about specifics related to the biodiversity. “Our issue is that

Rather than place compost on intact, biodiverse grasslands, let’s prioritize projects on grasslands that are already highly degraded or altered.
it’s still very much a research project,” Suba explains. Concerns include the program’s effects on native plant biodiversity and whether the compost will change the species composition of treated grasslands.

“So the CNPS stance is yes, soil amendments can be an effective tool to mitigate climate impacts,” Suba says, and the state must give the program’s highest priority to orchards, vineyards, and row crops. “Then let’s stratify efforts to put compost on grasslands by prioritizing projects on grasslands that are highly degraded or altered.” Areas of greater native biodiversity should be left alone. “Part of California’s work toward a climate-resilient future must be to characterize our grasslands for compost projects.”

A tree-covered mountain would seem to be the ideal carbon-storage site. In reality, California’s forests are suffering.

**Forests: Bringing them back to health**

A tree-covered mountain would seem to be the ideal carbon-storage site. In reality, California’s forests are suffering. Many are carbon emitters. Because of a century and a half of fire suppression, and timber harvesting of our largest, most fire-resilient, carbon-sequestering conifer species, today’s forests are overly dense with smaller-diameter trees that raise the threat of wildfire and increased GHG-emissions. Better forest management policies are in the works, but will take time. “We’re going to be in the negative for forest carbon sequestration for decades,” Suba says. “So the sooner we get started with ecologically strategic thinning and burning of our forests, the sooner we will achieve the benefits of more carbon-stable forests able to act as long-term carbon storage areas.”

Fire is an emotional topic in California, so when it comes to forests the CNPS conservation director wants to make clear two separate messages:

1. Some forests need to be restored to ecological health.
2. Some forest fuels need to be managed for human fire safety.

Both techniques remove trees and understory, but they’re done for different reasons and forest policies must differentiate between these different objectives, Suba notes. Thinning of trees around communities allows firefighters to deploy more effectively and can reduce the risk of homes catching on fire under normal (non-extreme wind) weather conditions. Thinning wildlands — via thinning of smaller diameter trees and understory vegetation, followed by regularly applied prescribed burns — can bring a forest to where it can handle a healthy, lower-intensity fire itself, sending up less smoke, and retaining more of the larger trees able to sequester and store more carbon.
“Our ecosystems here are disturbance-related,” explains Sue Britting, executive director of the nonprofit Sierra Forest Legacy. Fire is one of those natural disturbances in the forest; drought is another. Under uninterrupted conditions, these result in carbon moving in and out of the forest ecosystem.

Humans have interrupted nature’s system in two ways as far back as the 1800s, Britting says: By suppressing fires and by logging. Without regular fires to release carbon and make space for other plants, the forests have become more dense, with a buildup of small trees. Logging, meanwhile, removes the larger trees that are more fire-resilient, leaving behind the ladder and surface fuels that feed high-intensity fires.

Public recognition of the need for better forest management is growing, Britting says. Risk to humans from wildfire and smoke is the leading issue, but both are receiving attention from public agencies including the California Air Resources Board and the U.S. Forest Service.

Individuals can help contribute too, she says. “If you live in a fire-risk area, do what your local fire agency is telling you about defensible space.” Clearing and thinning will help humans and the forests. Also, it’s important to understand that fire is necessary to the plant community. “It shapes the landscape in ways that nothing else does,” she says. Fire affects plant diversity and the survival of rare plant species, opening up adequate space for healthy landscapes. “It’s very, very important.”

“We have to continue growing large trees,” Britting notes. That will require 100 years, but there is much California can do in the meantime. Using fire more effectively is a big part of that.

“Assuming we start to implement ecological thinning and burning at pace and scale we need starting today, we won’t see climate benefits from our forests for 15 to 25 years,” Suba says. “So the sooner we start the better.”

Deserts: The magic is underground
California’s deserts are an important source of carbon sequestration — a scientific fact most people are surprised to learn.

“People look at the desert and think, ‘There’s nothing happening out there.’ That’s the mindset we have to change,” says Robin Kobaly, executive director of The SummerTree Institute, a nonprofit based in Morongo Valley, San Bernardino County.

Kobaly is in the midst of a project to help spread the word on the importance of the desert in carbon sequestration, with a scientific paper, a book, and a large walk-through exhibit all elements of the plan. She wants Californians to know about the “microscopic soil...
A CALL TO ACTION

New book showcases the diversity of native blooms, and what could be lost

BY KATHY MORRISON

The beauty of a wildflower is ephemeral, and much more so when viewed in the shadow of climate change. Will the same species of flower bloom in the same spot next year, next decade, next century? If not, will future generations know what has been lost?

Photographers Rob Badger and Nita Winter have made California wildflowers their cause and their rallying point in the fight against “the beast” — human behavior that threatens native landscapes. Their photographs are collected in a magnificent book, Beauty and the Beast: California’s Wildflowers and Climate Change, to be published at the end of the year in partnership with the California Native Plant Society. The book also features essays by 16 noted environmental scientists, activists, and writers including Peter H. Raven, Mary Ellen Hannibal, Gordon Leppig, and Robin Wall Kimmerer. CNPS Executive Director Dan Gluesenkemp wrote the opening note to the reader.

Badger and Winter, who are partners in life as well as business, have been photographing wildflowers in nature for more than 20 years. Working only on public lands, they lug pounds of photo equipment into the desert or up mountain trails so they can capture the serene glory of a sacred datura (Datura wrightii), or the fiery red and yellow blooms of Franciscan paintbrush (Castilleja subinclusa). Astonishing
photographs of common harebell (Campanula rotundifolia) – the blooms glowing as if illuminated by blacklight – and translucent petals of checkerbloom (Sidalcea malviflora) demonstrate the breathtaking beauty of our native plants.

Eagle-eyed Winter often will spot their next subject. The flowers always are photographed in natural light as they grow, whether a few inches or several feet above ground. Badger and Winter use a black or white portrait backdrop to allow the flower’s details to come to the fore. To get the best angle, Badger often lies flat on the ground with his digital camera on a tripod, while Winter holds a reflector above. At other times, they gently wrap cloth around the plant to create complementary folds and shadows. Every once in awhile, a spontaneous picture presents itself; they call these shots their “Contact” Series. They also photograph panoramic landscape scenes.

One eye-catching image included in the book shows a rufous hummingbird feeding at a scarlet fritillary (Fritillaria recurva), its wings moving too fast for Badger’s camera. He says that picture was just luck; he was already photographing the flower when the bird flew into the frame. He clicked off two shots before it flew away. “That was the luckiest photograph in my entire life,” he says.

But the pair refuses to take pictures in any place where they feel their work will disturb the flowers or their habitats. They are dedicated to respecting the rights of the individual plant and its community, as well as any people who might follow them to that site. “Nita’s really conscious about where I place my knees and my feet,” says Badger. If they do have to move a rock or a twig, they gently restore it to its original spot, Winter says.

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A friend remembered in the magic of rare fawn lilies

STORY BY KATHY MORRISON
PHOTOS BY CHRISTINA TOMS

St. Helena fawn lilies (Erythronium helenae) bloom along the Oat Hill Mine Trail. The flowers hold special associations for friends of the late Eric “Fuzzy” Sayetta.

Right: Fields of blooming fawn lilies.

The rare wildflowers that bloom along Napa County's Oat Hill Mine Trail are especially meaningful for a group of friends who make an annual trek to the trail in memory of a dear pal. “It's one of my favorite mountain bike rides in the spring,” says Christina Toms. “The diversity and coverage of wildflowers is spectacular. It’s really, really special.”
It’s been nearly five years since Eric Sayetta, whose friends all called him Fuzzy, died of prostate cancer at age 59. He was the leader of a small group of mountain bikers who rode under his special command: “Find magic, and make magic happen.” That’s how they discovered the St. Helena fawn lilies (Erythronium helenae) on the Oat Hill Mine Trail. In the spring, these rare (CNPS rank 4.2) native wildflowers bloom in profusion along the rocky trail. “It’s like something out of a movie, so beautiful,” Toms says.

Toms is a member of the CNPS statewide board of directors and the senior scientist in charge of wetland restoration and climate change for the San Francisco Bay Regional Water Quality Control Board. Since she was a child, her bike has been her tool to get out into nature. “I’d teach myself what the plants were, what the animals were, what the birds were,” she says. Mountain bikers care strongly for nature, she notes. “If they didn’t, they’d be road cyclists.”

In 2002, she was in graduate school at UC Berkeley where she met Maureen Gaffney, a bike rider and now S.F. Bay Trail planner. Sayetta also was in this crowd, and Toms joined his subgroup that rode in search of the memorable experience. “It was always about going to interesting places and seeing interesting things,” Toms says. The group became legendary for its party stops, with spreads featuring cheesecake, chicken wings, shrimp kabobs, even brownies and ice cream. “We’d bring absolutely ridiculous food into the wild. We still do this,” she says.

Sayetta became known as Fuzzy to his pals because of his fondness for wearing Fuzzy Duds, a brand of wildly colored fleece shorts. “He was such a kind person. He would always make sure I was okay, and he taught me how to be brave,” Toms recalls. “It was all about people and relationships.”

The 8.3-mile Oat Hill Mine Trail follows a 19th-century route that was created to connect Calistoga, at the north end of the Napa Valley, with the cinnabar and mercury mines. Most of the bottom part of the trail today is fire road, Toms says. Many people hike or ride this lower part. “About Mile 3 or 4, it starts to get really rocky and you begin to see ruts of old wagon wheels in the rock.”

The landscape transitions from a combination of grassland and oak woodland to more volcanic soil, and the difficulty factor rises. In that rocky habitat grow plants not commonly seen: carpets of seep monkey flower (Erythranthe guttata), then rarer plants such as the fawn lilies, Kellogg’s monkeyflower (Diplacus kelloggii), and...
Purdy’s fritillary (Fritillaria purdyi). The friends every year would ride the Oat Hill Mine Trail, just to see fawn lilies. “We’d bask in their magic,” Toms says.

Laid off from his job in pre-Obamacare days, Sayetta developed a nagging back pain, but put off having it checked, Toms said. He thought it was related to a bike crash. And by the time he did see a doctor, the prostate cancer was advanced and had spread to his spine and bones. Another of the friends, a radiologist, had to deliver the bad news.

“We tried to take him out on rides at first, when he was sick. We actually started pulling him,” Toms says. Two group members would attach their bikes to his with bungee cords, and tow Fuzzy back and forth on the Shoreline Trail. One of those friends, Dana Wailes, recalls their most memorable ride was the annual Turkey Day ride in the Fairfax Hills, towing Fuzzy on their bikes via a long dog leash. “Eighteen miles and lots of steep climbs that we made up – all of them with no dabs and lots of thumbs-up from everyone,” Wailes says. Along with Sayetta’s daughter, Zoe, Wailes and Ken Downey were 24-hour caregivers during Sayetta’s last months.

Fuzzy’s ashes were scattered along the Oat Hill Mine Trail, near where the fawn lilies grow. And now when the friends visit the wildflowers there each spring, they visit their friend, too, Toms says. “We miss him so much.” Zoe Sayetta also came along this year. “It was the perfect day for a bike ride,” Toms says. “We have multiple party stops. Some people hike it, and some people ride it, and we all stay together and take our time.”

“We do it the way Fuzzy would have done it,” she adds. “Finding the magic in every day – what a great attitude. Magic lasts.”

Pausing along the Oat Hill Mine Trail is Michel Gasquy. The violet flowers at the left are blue dicks (Dichelostemma capitatum).
Two CNPS board members are also mountain bike riders. This might surprise some, but the native plant and mountain biking communities have much in common. Both board members, Christina Toms and Bill Waycott, are enthusiastic about the groups’ potential partnerships. Toms has been a Bay Area mountain bike rider since her days studying benthic algae as a graduate student at UC Berkeley. For three years, she’s helped organize an annual Wildflower Mountain Bike Ride on Mount Tamalpais, and last year worked with CNPS Rare Plant Treasure Hunt Manager Amy Patten at Trione-Annadel State Park. The wildflower rides filled up quickly, Toms notes. “There’s an enormous hunger to have organized events like this.”

When Waycott takes a break from operating his native plant farm, he serves on the Advisory Board of Central Coast Concerned Mountain Bikers (CCCMB), a not-for-profit organization in San Luis Obispo County, www.cccmb.org. The group focuses on construction, maintenance, and advocacy for multi-use trails (for hikers, mountain bikers, and equestrians). “As trail users, we are also very open-space friendly, and many CCCMB members join our CNPS botany bike rides on the Central Coast,” says Waycott. “With these opportunities and the right information, a broader diversity of outdoor enthusiasts can also become native plant stewards.”

Tips for responsible and fun botanical riding

• Stay on designated trails. These are usually the most sustainable, rideable routes designed to take riders to places (and plants) of interest.

• Stay on designated trails. Yes, this is the same as Rule #1 – it’s that important!

• Never use an e-bike on non-motorized trails. (An e-bike is any bike with a motorized assist.)

• Respect signs for closed areas and sensitive habitats. There’s often a good reason why an area might be closed to bikers.

• Treat the ride like a treasure hunt. Give yourself permission to stop and look closely at the landscape around you. Even the most boring fire road climbs can conceal hidden treasures. A lot of rare plants can be observed on roadsides.

With these opportunities and the right information, a broader diversity of outdoor enthusiasts can also become native plant stewards.”

More great resources for responsible mountain biking include:

– The International Mountain Bike Association’s Rules of the Trail page. The IMBA encourages riders to “take the pledge” to ride friendly; ride prepared; ride responsibly; ride lightly. Number 1 on their list: Respect the landscape. www.imba.com/ride/imba-rules-of-the-trail

– Trail Partners Marin County. www.safetrailsmarin.org/

– CCCMB has an excellent page on its website discussing how bikes and horses should interact on trails. www.cccmb.org/home-old/the-dirt--trail-info/bikes-and-horses

– The Hiking Dude website includes a good discussion of etiquette for all trail users. www.hikingdude.com/hiking-etiquette.php

Note: The bike-plant events mentioned in this article took place in parks with popular, well-used bike trails and roads that are already mountain bike destinations. No rare plants were impacted by the rides.
California native plants are Katherine L. Greenberg’s passion and her career. So it’s no wonder that her own garden is almost 100 percent natives. After nearly 40 years, the plants have grown in and settled, providing an excellent example of a mature garden of California flora.

Greenberg is a garden designer and native plant consultant, and has served on the boards of the Pacific Horticulture Society, Mediterranean Garden Society, and the Friends of the Regional Parks Botanic Garden, among many garden activities. She has been a CNPS member since the late 1970s. In 2012, she wrote the second edition of Growing California Native Plants (University of California Press), an expanded and updated version of the 1980 first edition by Marjorie G. Schmidt, whom she never met but feels she knew. “Her voice came through so strongly,” Greenberg says. She also counts California native plant expert Wayne Roderick, who died in 2003, as one of her mentors.
She began work on her own native garden about the time Schmidt’s book was published, which also was not long after an extended drought in California. The north-facing hillside had been cleared for agriculture before it was sold as a homesite. The property had mostly non-native grasses on the top portion, while a blackberry bramble extending down the hill to a creek covered the remaining third of an acre, she explains. Keeping the natural scarcity of water in mind, Greenberg set out to create a native landscape, drawing from her childhood memories of Monterey County native flora as well as the habitats of the East Bay hills. She warned her children that there would be no lawn at the house – there was plenty at the nearby school, in any case – though they could have a pool.

“It was not an instant garden, by any means,” Greenberg says. She experimented, drawing ideas from some of the state’s established botanic gardens, including the Regional Parks Botanic Garden in the Berkeley hills, and sometimes propagating plants. Some plants, such as madrones, simply did not take, she says. Others she found she could grow in pots easier than in the ground.

These days the Greenberg home fits so naturally into its landscape, it’s as if the house were a native plant, too.

These days the Greenberg home fits so naturally into its landscape, it’s as if the house were a native plant, too. The garden is gently layered, with oaks, manzanitas, toyons (Heteromeles arbutifolia), California wax myrtles (Morella californica), and a host of chaparral perennials providing the structure at the top of the property. One heritage valley oak (Quercus lobata) shades a corner of the house. Moving toward the lower slope, visitors can watch the breeze-fluttered branches of vine maples (Acer circinatum) and California bays (Umbellularia californica). Below those trees, the hill is covered with dry shade plants, including western sword ferns (Polystichum munitum), yerba buena (Clinopodium douglasii), and Douglas irises (Iris douglasiana). An ancient California black walnut (Juglans hindsii) stands guard at creekside.
The garden on the uphill side of the driveway includes Dr. Hurd manzanita (*Arctostaphylos manzanita* ‘Dr. Hurd’) with the tall flower stems of the silver-leaved white sage (*Salvia apiana*) in front of it. Several Howard McMinn manzanitas are beyond the Dr. Hurd manzanita, with coast live oaks and a coast redwood (*Sequoia sempervirens*) in the background. The grasses are leafy reedgrass (*Calamagrostis foliosa*).

Benches offer resting spots in niches, where visitors can watch deer wandering through the understory down to the creek. Greenberg’s garden has no fences and many deer-resistant plants, including a Sonoma sage variation that was discovered onsite and named for her: *Salvia sonomensis* ‘Greenberg grey.’

Greenberg’s overriding desire in planting the garden was to include visual and wildlife interests at each stage of the year. Just as the western bleeding hearts (*Dicentra formosa*) are fading, for example, the snowberry (*Symphoricarpos albus*) is coming into its own. And this native garden is full of color, from the cinnamon-red bark of the manzanitas to the bright berries of the coffeeberry (*Frangula californica*) and bright coral California fuchsia (*Epilobium canum*). Leaves are the only mulch, and some soil is left bare for burrowing native bees.

“Growing California Native Plants” includes several photos from Greenberg’s garden, augmented with many pictures from the Regional Parks Botanic Garden.

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**About the garden...**

**Garden location:** The hills of Lafayette (Contra Costa County), looking north toward Mount Diablo

**Garden size:** 1.3 acres

**Style inspiration:** “A refuge for people, plants and wildlife.”

**Design and Installation:** The Greenbergs built their home on a hillside where non-native grasses had taken over land once cleared for vineyards. Just a few trees were on the property; now there are at least 70. Katherine Greenberg employed a landscape designer to help install some of the larger plants, but has done much of the work herself over the years.

**Go-to native plant nursery:** California Flora Nursery in Fulton, Sonoma County.

**Irrigation:** An irrigation system is installed in only the upper acre of the property, with 16 stations, a mix of sprinkler heads, and drip lines. Greenberg runs it manually, only about once a month during the dry season, on cooler days with no wind, to reduce evaporation.

**Maintenance:** “I am the gardener,” she says. “I can weed the whole property in an hour.” An arborist helps with pruning trees when needed. Greenberg is out in the garden every day that she is home, tending and watching the plants change through the seasons. “It’s pretty self-sustaining at this point. I now take my cues from the plants.”

**Wildlife spotted:** Greenberg welcomes deer into her garden. She also has seen mountain lions, coyotes, foxes, raccoons, frogs, lizards, salamanders, squirrels and “many hungry birds,” including a Cooper’s hawk that nested in the garden. Wild turkeys wander into the pool area; motion-sensing sprinklers are used to keep them out.

**Favorite element:** The natural elements of the site are incorporated into the whole garden.

**Biggest challenge:** “Patience!” she says. That also is her advice to anyone starting their own native garden.

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Left: The edible berries of the pink-flowering currant (*Ribes sanguineum* var. glutinosum) ripen in late summer. The plant produces delicate pink flowers in early spring. Center: Low-growing with a refined appearance, California fuchsia (*Epilobium canum* ‘Schieffelin’s Choice’) brightens a spot along the driveway. Right: Showy milkweed (*Asclepias speciosa*) blossoms in front of a snowberry (*Symphoricarpos albus*).
Badger loves the desert, where he became overwhelmed by a superbloom in the Antelope Valley in 1992. In fact, he was so enthralled that he jumped in his car, drove all the way to the Bay Area to get Winter, then drove all the way back to show her the colorful expanses in the California Poppy Reserve. He was a landscape photographer at the time, while Winter was focused on the diversity of human faces. But they joined forces to record wildflowers beginning with the 1998 superbloom.

Now, after wet winters they begin photographing in late January, then follow the blooms as they unfold across the state. “One of the fun things about California is that you can find things, good blooms, probably seven months of the year,” Winter says. Peak bloom at 11,000 feet in the Sierra might even be in August. “Weather can really affect what’s blooming where,” she says. “We’re all up and down the state,” Badger notes.

Climate change itself is hard to track over just a few years, but one thing the pair has noticed in California is the increase in superblooms. The 1998 event they photographed was called a 100-year bloom then. But now, they say, there are more high rainfall years between drought years, and more moisture is available in desert regions. That creates more astonishing flower displays but also encourages invasive plants to move in and outcompete the native plants.

Winter and Badger also are concerned about the increased traffic from superbloom tourists, who trample the flowers or even lie down in them to take pictures, as seen this past spring. “It’s really hard for us to see people’s behavior,” Winter says. “We want people to get out and see, and value, the outdoors,” adds Badger. “But do you love it to death?” There are different levels of consciousness among humans when it comes to nature, he notes. So the people behind “Beauty and the Beast” have a hope and a goal for the publication: To raise awareness, and to change the actions that destroy the plants and their communities, Winter says. “The book really is about motivating action,” Badger says.

Beauty and the Beast is a companion to a large-format photography exhibit that already has been seen around the state, including at the California Museum in Sacramento, the Fullerton Arboretum, the Hi-Desert Nature Museum in Yucca Valley, and most recently the Bay Model Center in Sausalito. A semi-permanent exhibit also is at Chico State’s gallery through Nov. 24. The exhibit tour will continue in 2020 once the book is published, Winter says.
In the Garden

WITH RICHARD HAYDEN

Q: What can I plant during the fall planting season for great floral arrangements in the spring?

A: Many California native plants are great for arrangements. By bringing a little piece of the garden indoors, we get to have a sense of place and seasonality in our homes that other cut flowers just can’t provide.

A wide variety of native annual wildflowers can be planted by seed in the fall and ready for the vase come spring. Among the best are the Clarkias, which can last for several weeks as a cut flower. Two outstanding varieties are farewell to spring (Clarkia amoena) which has large showy flowers, and elegant Clarkia (Clarkia unguiculata), a taller inflorescence that makes a great vertical statement. Both have blooms in shades of pink and purple. The annual phacelias provide wonderful flower and foliage interest, including lacy phacelia (Phacelia tanacetifolia), which has fuzzy lavender flowers on tall sturdy stems that smell like honey. California poppy (Eschscholzia californica), although not the longest lasting flower in the vase, can provide a wonderful punch of orange to any arrangement.

Remember to cut flowers in the early morning while plants are most hydrated, and plunge into deep cool water for at least an hour before arranging if you can. This will help acclimate the flowers and provide more long lasting blooms.

Many California perennials and shrubs also make for great cut flowers and foliage, and while they may take a year or two (or more) after planting before they’re ready for harvesting, they will provide opportunities for years to come. Monkeyflowers are long-lasting and come in shades of pink, yellow, orange, and red. With a long bloom period and some shade tolerance these are great additions to any garden. The tall flower spikes of perennial penstemons are a strong upright addition to the vase, and the violet flowers of showy penstemon (Penstemon spectabilis) are a beautiful example. Other great perennials for cutting include asters (Symphyotrichum chilense), goldenrod (Soldigo spp.), buckwheats (Eriogonum spp.), and bush mallows (Malacothamnus spp.) and desert mallow (Sphaeralcea ambigua).

Some California natives to consider for their handsome foliage include sugar bush, (Rhus ovata) with glossy green leaves and wine red flower buds. Coast redwood (Sequoia

Richard Hayden is the Garden Director for the Elizabeth F. Gamble Garden in Palo Alto, CA. He has been an advocate for native plants since he served as the head gardener for the Nature Gardens at the Natural History Museum in Los Angeles. Previously, he enjoyed a 25-year career as a Los Angeles-based landscape designer. He currently serves on the boards of the Pacific Horticulture Society, Western Horticulture Society, and the Association of Professional Landscape Designers Bay Area District.

What do you want to see next in the Garden Q&A? Submit your topic ideas to kwernick@cnps.org.
sempervirens), coyote bush (Baccharis sp.), and giant chain fern (Woodwardia fimbriata), all provide great texture and a lush look. Finally, our native grasses can be standouts for floral arrangements, adding a delicate airy feeling. Canyon Prince wild rye (Elymus condensatus ‘Canyon Prince’) and the shade-tolerant California fescue (Festuca californica) are great examples.

Natives are great for cutting and bringing indoors! Have fun and experiment to see what works well in your part of California.

**Enjoy responsibly. Always harvest your flowers from your garden not wildlands.**

Right: Stunning iris (Iris spp.) steal the show in this multicolored arrangement including golden yarrow (Eriophyllum confertiflorum), yellow-eyed grass (Sisyrinchium californicum), sticky monkeyflower (Diplacus aurantiacus), penstemon (Penstemon spp.), lupine (Lupinus spp.), and more!

Left: This orange, yellow, and white-themed bouquet features a stunning matilija poppy flower (Romneya coulteri), golden yarrow (Eriophyllum confertiflorum), sticky monkey flower (Diplacus aurantiacus), yellow mariposa lily (Calochortus luteus), and mountain mule ears (Wyethia mollis). Deerweed (Acmispon glaber) and chamise (Adenostoma fasciculatum) add a touch of delicacy to these bold colors and textures.
magicians” that are stashing carbon away in the soil. But disturbing the desert soil, for example by building a large solar energy project, pulls the plug on carbon sequestration and other benefits.

In “Groundbreaking Discoveries Under Our Feet,” a paper she published earlier this year, Kobaly notes: “Scientists estimate that after the removal of desert vegetation and disturbance of the top soil, the pre-existing plant community requires about 50 to 300 years before it returns to pre-disturbance cover and biomass, but requires about 3,000 years before the disturbed area returns to the function it had before disturbance.”

Desert carbon sequestration keys on the existence of mycorrhizae, soil fungi that form symbiotic relationships with the roots of plants. An estimated 90 percent of all the plants in the world have mycorrhizal relationships. Desert plants, which can live hundreds of years, put down deep roots to reach moisture from long-ago rains, which means their fungal root partners also go deep in the soil. The partners exchange resources to thrive, but also work to store carbon. Here is how Kobaly describes it in her paper:

“Right at the point where a tiny fungal thread connects to the plant root, some of the carbon dioxide exhaled by roots and fungi reacts with calcium in the soil to form crystals of
calcium carbonate, or what is called caliche. Carbon in these crystals becomes locked into the soil.

“Over time, large chunks or even vast layers of caliche are built up underground, capturing carbon from our atmosphere in an underground lock-box and reducing its potential escape into the atmosphere. This transfer of carbon from air to leaf to root to fungal partner and into caliche deposits is one of nature’s ways to sequester carbon and hold it in natural storage underground. All that we need to do to keep the carbon safely stored in the underground caliche is to allow the desert plants to keep living and sequestering carbon.”

As a bonus, she adds, the hyphae, or threadlike structures, of the most common fungi have coatings of a substance called glomalin, which is made from the plant’s carbon. The glomalin persists in the soil long after the death of the hyphae that produced it — holding that carbon underground and keeping the soil together.

Kobaly initiated her project when the San Bernardino Board of Supervisors was scheduled to vote on changes in the General Plan related to placement of utility-oriented solar and wind projects in the desert. As Kobaly describes it, these huge projects in unincorporated areas have torn up the desert soil, disturbing its structure and stability, as well as the air quality, to the effect that desert residents nearby needed bulldozers to clear the blown-in sand from their front yards.

She started writing her scientific paper on the subject, but soon realized that illustrations would best get the message across to the supervisors. So she and an artist friend collaborated on an illustrated booklet. Their work was an apparent success; in February the supervisors voted 4-1 to ban large renewable energy projects in rural living zones and in unincorporated towns that have community plans.

The illustrated booklet soon grew into plans for a 54-page book, which in turn inspired an exhibit for the recent Joshua Tree National Park Art Exposition. The exhibit likely will tour, too, Kobaly says. She wants all Californians to learn that the desert is worth fighting for.

“People look at the desert and think, ‘There’s nothing happening out there.’ That’s the mindset we have to change.
Get your chlorophyll of plants

BY ELIZABETH KUBEY

What is your favorite recipe? One of mine is butternut squash chili! I go to the store to pick up all the ingredients for my favorite dish. But unlike us, plants can’t go shopping for their meals. Instead, they use the ingredients in their environment to make their own food. These activities will show us what that’s like for our plant friends.

Before we start our activities, let’s review some terms:

**Photosynthesis** is from Greek words: *photo*=light, *synthesis*=putting things together.

**Physical change** is when matter (stuff) changes in appearance without making a different kind of matter. *Example: Cutting a whole apple into slices*.

**Chemical change** happens when stuff turns into different matter with different properties. *Example: A rotting apple*.

**Chlorophyll** is a green pigment (natural color) found in many plants. It helps make food from sunlight, air, and water.

**Chloroplasts** are the part of a plant where photosynthesis happens. Chlorophyll is in the chloroplasts.

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**Photosynthesis**

*Photosynthesis flow*

Photosynthesis is energy transformation. Energy is power that comes from chemical or physical sources. Our bodies transform food we eat into energy we can use to be active. Plants take in light energy and transform it into chemical energy to make food (glucose). That’s called photosynthesis.

Now that you know a bit more about photosynthesis, let’s connect the process to native plants around you.

1) Find a native plant and see if you can imagine how the photosynthesis process flows through this plant.

2) Take a photo of a native plant and print it out.

3) Following the example on the left, draw the arrows and label what the arrows show. You can imagine what the roots might look like below the soil or research in a book or online what they look like.

4) Compare your photo to a friend’s!
Relay Race (Lesson adapted and photo from ellenjmchenry.com)
✓ Best for ages 10+ ✓ 30 minutes ✓ Group of 4-10 ✓ Green construction paper ✓ 10 index cards
✓ Envelopes ✓ Glue ✓ Marker ✓ Paper ✓ Flashlight ✓ Kids scissors

Photosynthesis requires teamwork between all players in the process! Let’s play a fun game to work together and better understand photosynthesis: water + carbon dioxide + sunlight = oxygen + glucose

Assembly (15 minutes)
Cut two large leaves from the green paper. Glue an envelope on each side of the leaf with the open side facing out. Label the envelopes on opposite sides of the leaves with “IN” and “OUT.”

On 5 index cards, label each one with one part of photosynthesis: water, carbon dioxide, oxygen, glucose (sugar). Repeat this on 5 more cards to make two sets. Optional: Decorate your cards to be easily read, like a raindrop for water.

Set-up (5 minutes)
Put cards for oxygen and glucose in the “OUT” envelope of the leaves. Put water and carbon dioxide cards in piles at the start line. Put the leaves at a distance you can run to from the start line. Put flashlights by the leaves.

Let’s play! (10 minutes)
Split into two teams. On the word go, the first member of the team takes either a “carbon dioxide” or “water” card from the start, runs to the leaf, and puts it into the “IN” pocket of their leaf. They run back and tag the next person. The second player takes the other start line card. The next person runs to the leaf, shines the flashlight on the leaf and says “photosynthesis,” turns it off and then runs back.

Now the leaf has had all the ingredients for photosynthesis! The next player runs to the leaf and takes out just one of the cards in the “OUT” pocket and runs it back to the team. The fifth player runs to the leaf, takes the last card out of the “OUT” pocket and runs with it back to the team. The fastest team wins that round!

You can play more rounds where everyone dances, hops, skips, or walk backwards to the leaf!

Thank you, plants!
✓ Best for ages 6+ ✓ 15 minutes ✓ Paper ✓ Pen

Photosynthesis is an important process that sustains life on Earth. Plants provide us cleaner air and water, food, and medicines.

Find a space to write thank you letters. First, write a letter from you to a native plant. Then, write one as if you were that plant thanking a part of your ecosystem for helping you thrive. Maybe even write a third one to a family member you forget to say thanks to! Use the example letter on the right to get started.

Share your letters with Elizabeth! With the help of an adult, post on social media and tag @californianativeplantsociety or email ekubey@cnps.org.
Mike Ross

California was experiencing its driest year to date when Mike Ross moved to the Bay Area in November 1976. A transplant from a wetter Texas climate, he was astounded to see the effects of the drought as he shopped for a home. After purchasing a home in Livermore, he set out to create a water-wise yard and found CNPS. Through the late ‘70s and early ‘80s he put his professional skills as a science writer and information officer to work writing news releases for the CNPS East Bay Chapter. In 2010, he joined the committee tasked with creating the first California Native Plant Week, a “wonderful and successful experience,” he says. These days, Mike lives in San Jose with his family and volunteers his time by helping administer the CNPS Facebook group.

How did you come to join CNPS?

I became aware of CNPS in 1977 after moving to Livermore from Beaumont, TX. When I looked at various houses, I was shocked that the only pretty lawns were those with buried sprinkler systems. It rains frequently in southeast Texas, even nice residential areas would flood several times a year, so I was delighted when the Livermore soil map told me that my new home was built on gravel with “excessive” drainage. I was certainly not going to fight Mother Nature and try to grow grass — especially during a record-breaking drought.

I asked colleagues at work for advice, and a Berkeley landscape architect named Sheila Brady was recommended to me. On my numerous day trips to familiarize myself with my new locale, I was amazed to see plants that thrived in the wild with no summer water. I was especially enamored with manzanita and its sinuous, burgundy-barked branches. I told Sheila that I wanted my garden to be drought-tolerant and to include as many California natives as was reasonable. It was through her that I learned about CNPS.

I attended my first CNPS Native Plant Sale (at Merritt College) to buy the natives plants Sheila had specified for my garden. I joined CNPS and its East Bay Chapter and went on quite a few field trips which, although I was not a botanist, I enjoyed immensely. I have always found CNPS members to be among the finest and most pleasant, generous, and enjoyable people I know.
I think it’s important to support the causes and institutions with which one finds personal resonance, common cause, and respect – both while we’re living as well in our bequests.” – Mike Ross

What are your favorite aspects of the CNPS mission?
I am closest to the CNPS horticultural/gardening work, but from an enthusiast, not an expert, point of view. Promoting native plants in our gardens is not an easy task, but I think that learning about the water-saving benefits of planting appropriate natives can engage Californians who might not (initially, at least) be active in hiking or environmental causes. That being said, I fully support all of the CNPS initiatives and activities, which I consider to be extremely well-conceived and executed, and absolutely needed.

Why have you provided for CNPS in your estate plans?
CNPS is always very close to my heart. I believe strongly in the CNPS mission and vision. I love all parts of it. I wish I could do more, but I have other interests and responsibilities as well. And that’s where making a provision for CNPS in my estate plans comes in. I think it’s important to support the causes and institutions with which one finds personal resonance, common cause and respect – both while we’re living as well as in our bequests. There are many, many worthy possibilities, of course, but for me, supporting CNPS helps to further a unique quest that I find compelling: promoting the knowledge and use of our native flora and saving threatened species from extinction.

Do you have a favorite plant or place?
I’m still very much a fan of manzanitas, wherever they grow. During my 12 years in Livermore, I had as many as 14 different manzanita varieties growing in my garden at a time. Among my favorite real-world places are the San Antonio Valley and Del Puerto Canyon east of San Jose, Pinnacles National Park – and my home garden.
individualism to a sense of connectedness, where we do realize our individuality, but also that our sense of self is a result of the relationships that we are embedded in. We are relational beings. I think we need the kind of cosmovision that Indigenous peoples are talking about. To not only seek to transform things outside of ourselves, but to also allow ourselves to be transformed by them.

We won’t know the extent of human potential if we limit ourselves to one way of relating to the world: ‘How can I produce or how can I consume or how can I use something?’ But if we change that perspective and open ourselves up to be transformed by these things, then we don’t know where that would take us. Parents understand it. They don’t just say, ‘How do I put my kids to work so that they will benefit me as some kind of social insurance when I’m older?’ They say, ‘How does being a parent transform me as a person?’ That is the leap that we have to take. And we’re not leaping into the unknown. There are thousands of years where this is the view that people had. The world was enchanted and we were a part of a conversation, a much richer conversation. We need to re-enchant the world in that way. That’s important. And I think that needs to be brought in over and over again. It will come. I think that this is only the beginning.

CNPS chapters are exercising a right to stewardship across California and Baja, Calif. Local habitat projects like those featured here require ongoing, steadfast work. These efforts continue thanks largely (and sometimes only) to volunteers who give their time season after season to care for the places they call home. “People by nature want to conserve and share,” says Bavikatte, who challenges assumptions that humans act only in self interest.
That reminds me of the quote that ends your book (which everyone needs to read). Joji Carino of the International Alliance of Indigenous Tribal People speaking to the United Nations says, “The campaigns of Indigenous communities are misjudged as the ignorance of primitives unschooled in modern economic realities. But make no mistake. We are not peoples of the past – we are your contemporaries and in some ways maybe your guides toward more sustainable futures in the 21st century.” I just love that quote.

Yeah. There’s a great line in Elliot’s “Four Quartets” where he says, “We shall not cease from exploration, and the end of all our exploring will be to arrive where we started, and know the place for the first time.” It’s a return to something but with new eyes. No one is advocating turning back the clock or a romanticism about “the good old days.” It’s about saying, “Having done all of this, having seen all of this, what is of true importance for us now as a people, as a species?” If we’re going to remake the world, and we have to because we are on the edge of a precipice, what truly matters and what new versions of the brave new world can be built based on this?
Upcoming Events | OCT 14 - JAN 25

Fall planting season is here! Pick up a few more plants, enjoy a hike, or learn something new at a talk or class! Be sure to check cnps.org/events for the latest details and registration information.

Featured Event | Make a Native Wreath for Fall | Santa Clara Valley Chapter

OCT

OCT 17
Creating a Native Rain Garden
Santa Clara Valley Chapter
Sherri Osaka shows you how to get ready for the rainy season by directing rainwater into your garden and solving drainage challenges.

OCT 19
San Bruno Mountain Hike
Yerba Buena Chapter
Doug Allshouse will lead you through Dairy Ravine to Cable Ravine. These two ravines share interesting native plant communities with an endangered butterfly habitat.

OCT 22
Mount Madonna Field Trip
Monterey Bay Chapter
Identify plants with Andy Werner along a seven-mile ascent. We’ll savor the sights, smells, and beauty of nature along the trail.

OCT 26
East Weaver Creek Hike
Shasta Chapter
Enjoy fall color from dogwood, big-leaf maple, and California hazelnut on this four-mile round-trip walk in the Shasta-Trinity National Forest.

OCT 26
Fountain Thistle Work Party
Santa Clara Valley Chapter
Help continue to make a San Mateo restoration site a success story. We’ll continue to remove invasive species to help the once-endangered fountain thistle thrive.

OCTOBER 31
Del Monte Forest Hike
Monterey Chapter
We’ll enjoy a nicely shaded lollypop loop that begins in Carmel and leads into the quiet Monterey pine forest of Pebble Beach.
UPCOMING EVENTS

NOV
NOV 2
Annual Foothills Festival
River Ridge Institute
Gather with the community to enjoy live music, drinks, art, a native plant sale, and more!

NOV 7
Management of Rare Plants and Butterflies of San Bruno Mountain
Yerba Buena Chapter
Hannah Ormshaw is in the field monitoring butterflies, completing vegetation surveys, mapping, and more. Learn how she helps manage these sensitive habitats.

NOV 9
Palm Springs Rare Plant Treasure Hunt
Search for Leopold’s rush, narrowleaf sandpaper plant, and other desert rarities. Participants should be able to hike up to five miles.

NOV 14
NorCal Botanist Certification
Take the botanist certification exam in Sacramento! Help raise the standard for our surveys to protect our plants and places. Register by Oct 29.

JAN
JAN 25
Winter Native Gardening Workshop
San Diego Chapter
Save the date now, and check the chapter’s website (cnpssd.org) in December to learn more!

Protect California Wildlands!
Join Cal-IPC to protect our environment and economy from invasive plants. www.cal-ipc.org

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upcoming events

Did you know...
Fall is the perfect time to plant natives!

Final Fall Native Plant Sales!

We’ve had an awesome season of plant sales, and there are still a few chances to pick up more native plants!

- Oct 14-Nov 4 - Santa Barbara Botanic Garden
- Oct 18-19 - Sequoia Chapter
- Oct 19-20 - Rancho Santa Ana Botanic Garden
- Oct 19 - North San Joaquin Valley Chapter
- Oct 19 - Shasta Chapter
- Oct 19 - Santa Clara Valley Chapter
- Oct 19 - Kern County Chapter
- Oct 19-20 - Rancho Santa Ana Botanic Garden
- Oct 24-26 - Theodore Payne Foundation
- Nov 2 - San Gabriel Mountains Chapter
- Nov 2 - Riverside/San Bernardino Chapter

Mark Your Calendar!

Final Fall Native Plant Sales!

Theodore Payne Foundation

FALL PLANT SALE

Just in time for fall planting, Theodore Payne Foundation offers its widest assortment of the year, including native plants, seeds, and bulbs – all at discount prices!

TPF Members: 15% off plants, seed, bulbs, and TPF gear
Non-members: 10% off plants, seed, bulbs and TPF gear

Join at the door to support Theodore Payne Foundation and get a great deal!

FALL PREVIEW SALE

TPF Members at and above the Contributor level can shop the Fall Preview Sale, 12:30 to 4:30pm.

Theodore Payne Foundation for Wild Flowers & Native Plants
10459 Tuxford Street | Sun Valley, CA 91352
theodorepayne.org | 818 768 1802

Irvine Ranch Water District is a proud sponsor of the California Native Plant Society.
View our plant selection guide at rightscaperesources.com
SAVE THE DATE!

CNPS 2021
Conservation Conference
October 28-30, 2021
San Jose, CA

Workshops & Field Trips October 26-27
DoubleTree by Hilton San Jose

CONFERENCE.CNPS.ORG
The website that helps you restore nature one garden at a time!

- Discover which native plants grow in your exact location
- Create a personal plant list for your yard
- Search by water needs, pollinators, flower color, and more!
- Find nearby native plant nurseries
- New! Discover host plants for local butterflies

Start your free account today! Calscape.org