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CALIFORNIA NATIVE PLANT SOCIETY
BULLETIN

Citizen Science

Author Mary Ellen Hannibal on an innately human role

As human animals, we're drawn to the natural world. The impulse to observe, touch, and understand begins at birth. It's no wonder then that, throughout human history, laypeople—philosophers, gardeners, and vagabonds alike—have contributed to the most meaningful scientific knowledge we have. As Joseph Campbell said, myth is nature speaking, and the goal of human life is to align with nature.

While we now have a professional discipline we call "science," everyday citizen scientists are needed now more than ever. As an organization founded by citizen scientists more than 50 years ago, CNPS is acutely aware and appreciative of this reality. Without the observations, painstaking work, and passion of thousands of people over decades, contributions like the Manual of California Vegetation and the Inventory of Rare and Endangered Plants would not be as rich or even possible. The work continues today through Rare Plant Treasure Hunts, chapter field trips, the Important Plant Area Initiative, and more. That's why Mary Ellen Hannibal's new book, Citizen Science: Searching for Heroes and Hope in an Age of Extinction has been especially meaningful to many of us. We caught up with Hannibal recently to discuss her latest work and the personal experiences that inspired its content.

What is citizen science? Is it new?

MH: Citizen science generally means regular people contributing to scientific research. Indigenous cultures have long observed nature to create "traditional ecological knowledge." Charles Darwin was a citizen scientist—he worked on his own and he didn't have an advanced degree. Science really didn't get professionalized until the 20th century. We are returning today to a new, but old, platform for widespread involvement in understanding the natural world.



Photo by Greg Suba

Citizen science fieldwork in action at last year's Joshua Tree Workshop, hosted by CNPS.

How did you develop a passion for citizen science?

MH: While researching my 2009 book (with photographer Susan Middleton) *Evidence of Evolution*, I interviewed scores of scientists virtually all of whom

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Plant Exploring

San Gabriel Mountains

In 1997, teaching 6th graders at the Los Angeles County Outdoor Science School, I first discovered the San Gabriel Mountains. The school, located in Wrightwood at an elevation of 6,000 feet, was (and still is) nestled in a mixed conifer forest with pines, firs, and oaks. Students from across the county came for a week and we spent everyday outside—tromping through the mountains, exploring hands-on, place-based concepts.

While my working title was teacher I was just as much a student, with local botanists, geologists, ecologists, and cultural historians serving as my mentors at night or on weekends. It was during this time I first developed an understanding of biogeography—how abiotic factors affect the distribution of flora and fauna.

The San Gabriel Mountains rise to 10,000 feet above the Los Angeles Basin, stretching from western San Bernardino County to Santa Clarita along the I-5

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Photo by Michael Kauffmann

Limber pine (*Pinus flexilis*) on the summit of Mount Baden Powell, San Gabriel Mountains.



From the Executive Director
Communication is Key

CNPS has accomplished so much in its 50+ year history, and most of it is due to communication. Over the years, we've listened, learned, and taught our friends, family, and neighbors. We've offered up thousands of chapter presentations, shared scientific data, field trips, trainings, and publications. These and our many other forms of engagement and outreach have helped Californians appreciate and protect our native plants, while also creating a sea-change in what it means to garden. That said, we have more work to do.

> "Recently, one of our members referred to CNPS as 'the world's best kept secret.' Today, we're resolved to change that.

Recently, one of our members, Mary Frances Kelly-Poh, referred to CNPS as "the world's best kept secret." Today, we're resolved to change that. My guess is that at least 30 million Californians haven't heard of CNPS, and far too many of them don't even know about native plants. We need to communicate with them!

When I started at CNPS five years ago I made strong communication central to my work. I visited chapters and listened to everyone I could, hearing concerns and discussing solutions. We then got to work addressing key chapter needs, to better support volunteers and strengthen chapters. Staff have "beat the street" to give talks, developed an inspiring Conservation Report (hopefully you enjoyed it), published beautiful new books, rolled out new workshops, delivered the online Calscape plant finder, and even, perhaps, done a little guerrilla posting of CNPS stickers and garden signs in strategic places. Today, our chapters are stronger than ever, and new chapters are emerging. Countless great ideas shared with me by chapter leaders and CNPS members have seen fruition. Thank you for communicating your ideas and needs!

As we do this, it's become clear that all these great ideas need focused effort and significant resources, and so we made the decision to invest more in this critical part of our mission. Hopefully you are already noticing results–for example, this Bulletin is lengthier than normal with more and newsier stories. In the months to come you will see more progress, ranging from improved web tools and super easy events calendars, to more mass media coverage of CNPS efforts: chapter activities, gardening guidance, and conservation concerns. You'll see more Native Plant Week buzz, and more students than ever at the upcoming 2018 CNPS Conservation Conference.

While we're trying some new approaches, YOU are still the most important part of our communication platform. When you talk with a neighbor, write a letter to the editor, or promote a post, you are contributing to our success. I hope you see your hand in our recent successes, and hope you will please... keep communicating!

Dan Gluesenkamp
CNPS Executive Director

End of Year Gifts and Membership

Thank you to those who made recent donations to support our critically important work. Please forgive any delay in processing year-end 2016 gifts. We had great response to our end of year appeal and Conservation Report, which meant our operation was a bit overwhelmed. Thank you for being patient, as we celebrate the good news and get caught up.

Now, donating is easier than ever: Go to **cnps.org/donate** to make a one-time donation using your credit card or via PayPal. You can also set up recurring monthly donations.

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Cultural Connection
The Importance of Geophytes

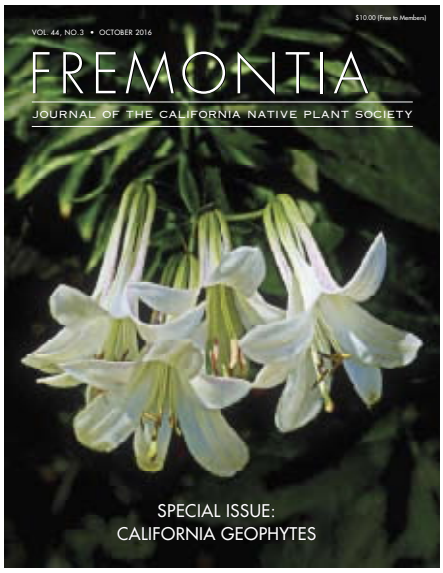
Researcher and author Kat Anderson is perhaps best known for her much-loved work, *Tending the Wild*. Her contributions to ethnobotany and historic ecologies in California have greatly expanded our understanding of the human relationship to native plants. Recently, we were privileged to have Kat serve as our *Fremontia* guest editor for a beautiful double-issue on geophytes. The following is an excerpt, capturing some of the highlights.



M. Kat Anderson.

Excerpt from Kat Anderson and Philip Rundel in California Geophytes

In the course of evolution, plant species have developed a myriad of adaptive features that help them survive environmental stress. One such adaptation that has evolved multiple times in diverse lineages is the geophyte growth form. Geophytes have an underground storage organ which allows the plant to die back to the ground and go dormant during unfavorable seasons for growth. Renewal buds associated with the storage organs allow a new cycle of leafing and blooming when favorable conditions return.



Gardeners tend to lump most geophytes as "bulb" plants, but a broad definition of geophytes would include a morphologically diverse group of species that have adapted differing forms of storage organs.

If we think about global ecosystems that experience seasonal stresses where the geophyte growth form may be successful, there are three biomes where these plants are conspicuous components of the flora. The first is the arctic or alpine tundra which has long cold winters. Underground storage organs allow plants to develop vegetative tissues quickly and flower in the short growing season. A second example is the temperate deciduous forests where the understory is heavily shaded in the summer growing season. In these habitats, geophytes can resprout and flower in the late winter or early spring before regrowth of the tree canopy above.

The global sweet-spots for geophytes lie in the world's Mediterranean-type climate regions, where there is a predictable summer drought. Under these conditions, and with fire as a frequent component of the disturbance regime, the geophytic form of growth provides a highly successful plant strategy of survival. Mediterranean-type climate regions arguably represent the highest diversity of geophytes of any of the world's biomes.

In the end, technical botanical definitions aside, geophytes are defined in a number of practical manners so long as the intent is clearly stated. While underground storage organs have evolved independently in a number of morphological forms, the ecological function and adaptive strategy is much the same.

Visit cnps.org/fremontia/geophytes for more information. We hope you are enjoying the issue!

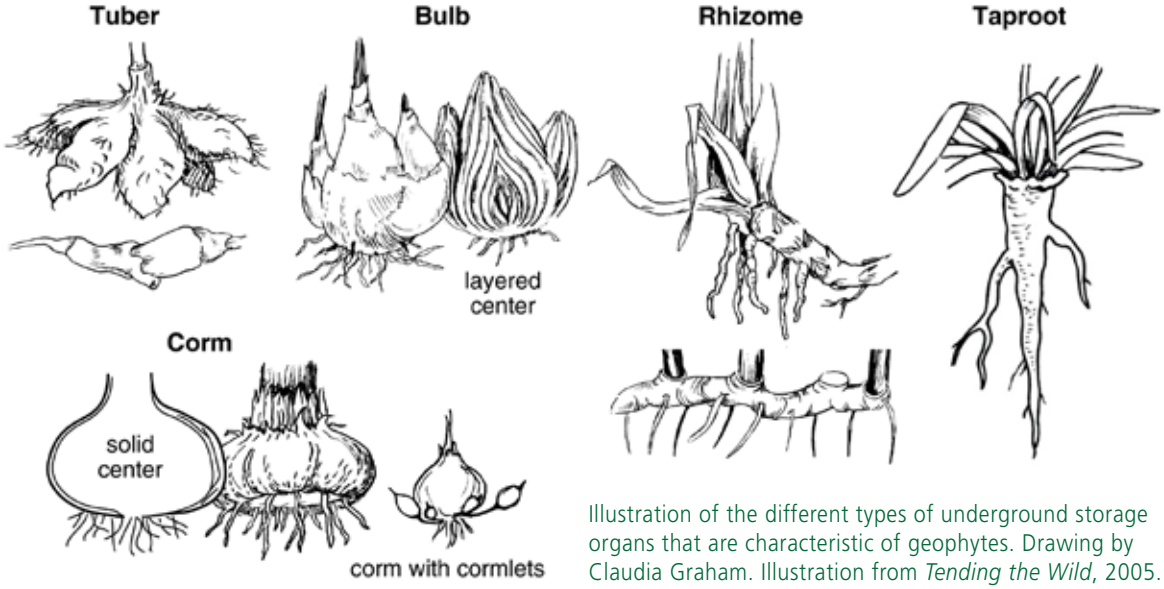


Illustration of the different types of underground storage organs that are characteristic of geophytes. Drawing by Claudia Graham. Illustration from *Tending the Wild*, 2005. Courtesy of the University of California Press, Berkeley, CA.

Conservation Update

CNPS IPA Initiative: Mapping California's Plant Conservation Hot-Spots

As California's population continues to grow, development and infrastructure of all kinds follow. At the same time, natural resource managers and conservationists have new opportunities to preserve and restore natural lands. Today, we must work rapidly to identify which lands must be conserved and take advantage of resources to do so.

But how do we know which lands to protect? And how do we ensure our native plant resources get adequate representation in the process?

The CNPS Important Plant Area (IPA) initiative is tackling those questions by assembling and mapping California's botanical data region by region. This botanical data can then be modeled into a wall-to-wall Plant Conservation Index for California that informs regional planning for years to come.

But this kind of data doesn't come easily. To do it right, we must work painstakingly to collect the best information we and other experts have available. As we identify each study area, the CNPS Vegetation Program and Rare Plant Programs are working to assemble and filter existing records from the California Natural Diversity Database, the Consortium of California Herbaria, rare and unusual vegetation alliances and associations from available vegetation maps, unusual soil layers, and other vegetation data sources available to CNPS. Next, we invite the best local experts to join us around the table for two-day workshops to validate our findings and add to the data set.

"This botanical data can then be modeled into a wall-to-wall Plant Conservation Index for California that informs regional planning for years to come.

Round One – Bakersfield IPA Workshop

In February, we hosted our first Important Plant Area workshop in Bakersfield. The CNPS conservation and plant science teams met with 20 Tulare Basin botanical experts (see below). The group quickly rolled up its collective sleeves and gathered around maps and laptops to review the data and add what's missing. The gathering was fantastic and exactly what's needed to make this initiative a success!

Having obtained prior permission to access the area, we ended the workshop with a guided tour of the lower-elevation hills on the north side of Tejon Ranch. Bobby Kamansky of College of the Sequoias noted many of the different species we observed, which included blooming hillsides of coreopsis (*Leptosyne calliopsidea*), fiddleneck (*Amsinckia eastwoodiae*), phacelia (*Phacelia tanacitifolia*), occurrences of the rare Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), and many more. Ellery Mayence of the Tejon Ranch Conservancy provided history and background of land management of the area, and botanists Neal Kramer and Nick Jensen directed the group across the Tejon hills. It was an amazing day to celebrate the beauty of Kern County and remind us why we do the hard work of protecting our California native plants.

Special thanks to Randi McCormick, who hosted the event at her company's new offices in Bakersfield!

Photo by Catherine Curley



Twenty Kern County botany experts joined CNPS for the two-day IPA workshop in Bakersfield.

A Model that Works

Our current IPA project is modeled off the work Heath Bartosh, Lech Naumovich, and Laura Baker completed with the East Bay Chapter to produce their *Guidebook to the Botanical Priority Protection Areas of the East Bay*. Two years ago, I also used a similar and less sophisticated approach at CNPS Chapter Council meetings to

Photo by Catherine Curley



A guided hike at Tejon Ranch capped off the Bakersfield workshop.

identify important plant areas within the Desert Renewable Energy Conservation Plan (DRECP).

Today, funding from the Mead Foundation and an anonymous donor have allowed us to expand our efforts to formalize the IPA project. We're starting in the Central Valley, moving south to north, in order to catch up with ongoing statewide planning, which is driven largely by renewable energy, transmission, and infrastructure development interests looking for least-conflict development sites and advanced mitigation opportunities.

If the Bakersfield response is indicative of future workshops, it is just the thing we need at this moment to galvanize our efforts toward native plant conservation. The next workshop will focus on the northern San Joaquin Valley and be in or near Fresno in July.

CNPS continues to seek funding to support our future workshops. Please consider donating today at ***cnps.org/donate.***

By Greg Suba
Conservation Program Director

Thank you to all the experts and organizations that participated in the recent Bakersfield IPA Workshop!

Fred Chynoweth	Kern CNPS
Lucy Clark	Kern CNPS
Julie Clark De Blasio	L A/ Santa Monica Mountains CNPS
Catherine Curley	CNPS
Ellen Cypher	Kern CNPS
Andrew Glazier	Consultant
Clyde Golden	Kern CNPS
Rob Hansen	College Of the Sequoias
Nick Jensen	Rancho Santa Ana Botanic Garden
Bobby Kamansky	College of the Sequoias
Denis Kearns	BLM
Russell Kokx	Consultant
Neal Kramer	Consultant
David Magney	CNPS
Ellery Mayence	Tejon Conservancy
Randi McCormick	McCormick Biological
Diane Mitchell	Consultant
Laura Pavliscak	Tejon Conservancy
Jaime Ratchford	CNPS
Rich Spjut	Kern CNPS
Greg Suba	CNPS
Greg Warrick	Center for Natural Lands Management
Chris Winchell	HT Harvey
Camdilla Wirth	Sequoia Riverlands Trust

Citizen Science continued from page 1

said, "I'll tell you how life begins, but let me tell you first how it is prematurely terminating." Upwards of 23,000 species today are threatened with extinction. In just the past 40 years, wild species populations have shrunk in alarming numbers: 39 percent of marine wildlife and 76 percent of freshwater wildlife are gone. A billion birds have disappeared from the continent since 1970.

My life changed when I fully grasped this. I wrote my next book, *The Spine of the Continent*, to help explain how and why it's happening. Along the way I asked myself, 'What could scale to actually save nature?'

Researching *The Spine*, I participated in some citizen science projects. I helped monitor the health of Utah forests, which led to changes in grazing rules. I participated in carnivore tracking in Arizona, which helped establish highway overpasses to help wildlife avoid becoming roadkill. I joined teams of people from multiple ages, races, and walks of life. No one talked politics. Once people observe and document nature, they are more likely to become advocates for their study subject. I saw this happen with my own eyes. Direct participation in nature helps save it. Today citizen science is turbo-charged by smartphone technology and vast computing power – I don't think we have yet begun to unpack its potential. I was inspired to write *Citizen Scientist* to help spread the word.

How can citizen science address extinction?

MH: The biggest culprit in worldwide species reduction is habitat loss. When new development is on the docket, we need to be more informed about the habitat being displaced. Data collected, even from urban decks and suburban back yards (with highly vetted programs like eBird and iNaturalist), can help create a better picture of what species are on the landscape. With plants in particular, citizen science can help uncover remnant historical species and help increase their numbers so that native pollinators, birds, and more are also welcomed back onto our landscape. Plants are ground zero for documenting the impacts of climate change on the biotic world, and projects that monitor when buds open and leaves drop are essential to helping plan adaptation strategies in a time of uncertainty and change.

Is citizen science "real" science?

MH: Even among PhD scientists themselves, there can be confusion and a conceptual lag about how citizen science relates to what we think of as "pure" science. Western scientific tradition begins with a hypothesis, a question, which is then tested by practitioners through an experiment. When the same results are achieved again and again by many different researchers we become satisfied that "real" science has occurred. Citizen science begins at the same beginning. There's an observation, a question, and a strategy is devised for inquiring more deeply into what is going on. Caren Cooper, whose book *Citizen Science: How Ordinary People are Changing the Face of Discovery* is like mine, an intro-

Citizen Science Opportunities With CNPS

Rare Plant Treasure Hunts – Coming this spring! Join an upcoming field trip and learn how to plan your own rare plant trips.

Seed and Specimen Collection – Get trained by CNPS and help this important effort.

CNPS De-Extinction Project – see page 7 for details.

Photos and Video– Your documentation may be used in our databases, conservation efforts, and to help educate the public at large. Contact lokeeffe@cnps.org for document sharing options.

To get involved, please contact your local chapter or cnps@cnps.org.

How can you CitSci?



The Observer is an application for smart phones that allows you to quickly and efficiently report wild plant occurrences, making it easy for you to report the species name, date, and location of over 10,000 California native and non-native plant taxa. You can also add a photograph to a report and share it with others later to confirm identification. Your reports are transmitted wirelessly to the Calflora database, where you can edit them and see them on a map.

iNaturalist is a place where you can record what you see in nature, meet other nature lovers, and learn about the natural world. The world is filled with naturalists, and many of us record what we find. If enough people recorded their observations, it would be like a living record of life on Earth that scientists and land managers could use to monitor changes in biodiversity, and that anyone could use to learn more about nature.

iNaturalist



eBird

Birds? Why of course. As flowering times change it is important to document the birds that are dependent on the native plants flowers or the insects that they may feed upon. As Alexander von Humboldt said (and as John Muir liked to quote) everything is interconnected. This app seamlessly links your observations with a global online database of bird records used by hundreds of thousands of birders around the world.

Other Citizen Science Applications:

- Project Feederwatch
- OceanSpaces
- Zooniverse
- Floating Forests
- West Coast Whale Alert
- Vital Signs



Mary Ellen Hannibal

duction to the field for the general reader, and points out that citizen science "extends research pursuits beyond what scientists could do alone. For example, scientists typically work in one study site; with citizen science, observations can be gathered across the world, leading to different types of generalities." What Cooper is describing is the *Big Data* aspect of citizen science, which allows us to grapple with the global issues confronting us today. For example, the largest marine die-off known to human history is occurring along the west coast of North America, with sea stars disappearing from Alaska to Baja. Citizen scientists using iNaturalist, and also helping via plain old data sheets and pencil, make it possible to monitor this gigantic landscape. There are simply not enough scientists to do that.

Citizen science extends the spatial reach of science, as I just described, and it also makes possible a much deeper temporal understanding of how nature is working. In my book I write about David Inouye's path-breaking research on phenology at the Rocky Mountain Biological Lab in Crested Butte, Colorado. With other professionals, Inouye has documented the date of first, peak, and last blooms of wildflowers since the 1970s. He's also tracked the comings and goings of pollinators, and when small mammals emerge from hibernation. The grist of Inouye's work however, is made possible by the efforts over the same time period of one Billy Barr, a citizen scientist who has every year fastidiously documented the weight and depth of snowfall in the area, as well as the date it stars to melt. In sum, Inouye and Barr have shown that snow is melting earlier and earlier, triggering flowers to bloom, but pollinators haven't changed their schedule, and are increasingly missing the food source historically available at Crested Butte during that time. This kind of biotic "mismatch" is a growing phenomenon of climate change, and we would not be able to document it without citizen scientists.

How does CNPS fit into the picture?

MH: Citizen science is about much more than data points. It is about being where you are, knowing what other life forms are present with you, how living and nonliving systems create the world we call home, and how all this evolved. We are darn lucky to live in our own California Floristic Province, which CNPS helps document, conserve, explain, and celebrate. Citizens participating in the CNPS Native Plant Treasure Hunt help tell the story of the special plants that ground our sense of belonging. This is our time, this is our place: discovering these species is a revelation that helps us co-create a vibrant future. Co-creation is citizen science.

visit
www.cnps.org/education

Sign of the Times
CNPS De-Extinction Project

CNPS has embarked on an exciting new project that hopes to not only stem the tide of plant extinctions, but to possibly reverse it! Sound like some sort of science fiction? Not exactly.

The CNPS De-extinction Project is a science-based effort to re-evaluate the twenty-two species currently ranked as "1A" (Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere) by first attempting to rediscover them in the field, revisit botanical gardens where species may persist, and also visit herbariums where viable seeds may remain as part of historic vouchers.

In other cases across the world, species thought to be extinct have been rediscovered in recent years. This fact gives us hope that some of the twenty-two native plant species thought to be extinct in California will be found again.



Photo bVince Scheidt

The small "Garden of Extinction" in South Africa's Kirstenbosch National Botanical Garden preserves many species that are now extinct in the wild. Botanic parks and arboreta are essential elements in the process of plant de-extinction.

A couple of years ago, I stumbled upon the "Garden of Extinction" in South Africa's globally treasured Kirstenbosch National Botanical Garden. What I found was a small, but incredibly important holding. The Garden of Extinction held species which had long-ago disappeared from the wild but are now managed and propagated at Kirstenbosch. It was thrilling to see these amazing survivors, and it gave me great hope for California' s lost native plants.

Vince Scheidt
CNPS Board of Directors



Madera-Manteca Development

Home to sleepy valley communities, rich farmland, numerous endangered species, and special plant communities sprawling development in this area has been relatively limited due to long commute times. The first HSR segment promises to change that by building a line straight into Silicon Valley.

Monterey Shale Formation

Estimated to contain half the United State's frackable shale oil, this site would produce about 15.4 billion barrels via hydraulic fracturing.

Southern San Joaquin Development

While too-often derided as a "Congress created dustbowl," California's San Joaquin Desert is home to rare foxes, kangaroo rats, leopard lizards, and endless spring flower fields. Rare alkali plant communities are an irreplaceable relict of old California but in recent decades, a small cadre of land speculators have bought up these lands. If the WaterFix tunnels start delivering that water, and the trains start shuttling commuters, these speculators are set to develop the region.

Tejon Ranch

A legacy of old California, endless acres of oaks and wildflowers, diverse wildlife, and responsible grazing. After acquisition by a development corporation, enviros sued and settled for a deal that temporarily protects much of Tejon in exchange for building three massive housing developments. CNPS is one of just five groups that refused to settle, still fighting for the dream: Tejon Ranch National Park.

Newhall Ranch

Proposed construction sites did not account for populations of rare plants. CNPS took the issue to the California Supreme Court and, in 2015, the Court ruled in favor of conservation. Even as we celebrate this major win, the vigilance is required to ensure subsequent Newhall plans provide sufficient solutions for native habitat.

ey and High Desert Development Threats

Next chapter in a continuing story?

When CNPS formed 50 years ago, California was a different place. Then Governor Pat Brown saw the potential for growth and implemented an infrastructure program that changed everything: aqueducts brought water to new cities, new highways fueled commuters, and human populations doubled while fortunes were made.

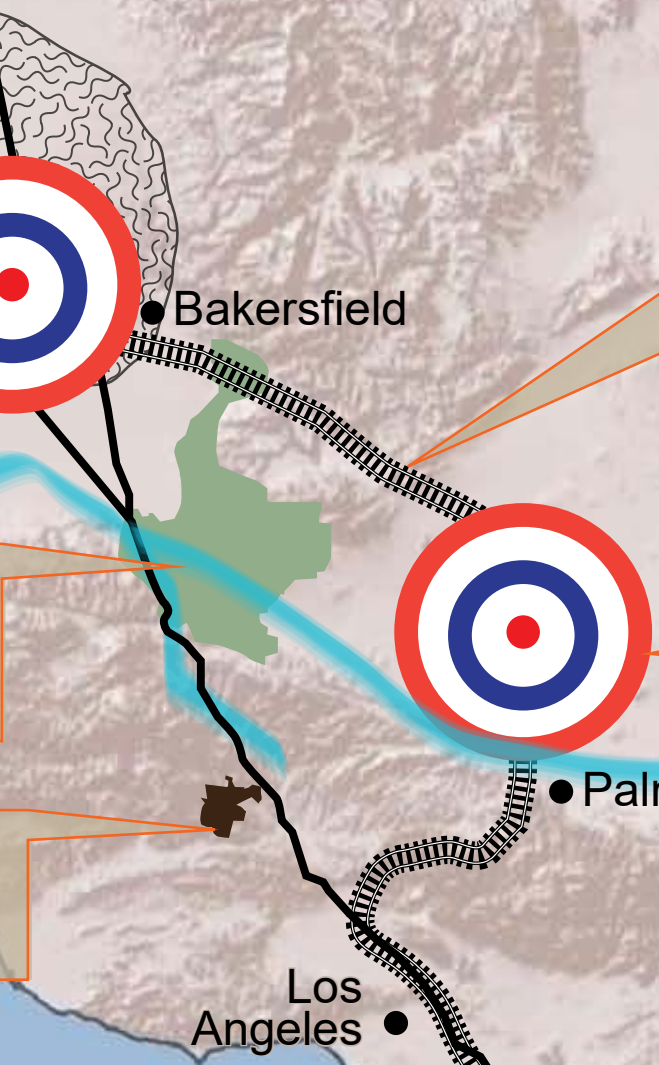
Today we see similar efforts under way. While our current Governor Brown is taking a strong stand against the Trump administration's anti-environmental actions, he is aggressively pushing water and transportation projects here in California that open entire ecoregions to development. The map below illustrates a few of the factors that CNPS scientists and activists are facing today, and perhaps for decades to come.

WaterFix

The proposed Delta Tunnels would create two 30-mile tunnels in the Sacramento-San Joaquin Delta, each large enough to carry the entire flow of the Sacramento River. Today, 96 percent of restoration funding has been removed from the project. The plan now appears to be a bold effort to secure a reliable water supply for investors who own substantial land and control major water rights in the Southern San Joaquin and beyond. Proponent planning documents show the majority of economic benefit going to residential and industrial development, with agriculture a relatively minor beneficiary.

High-speed Rail

While the voted-approved HSR promised LA-to-SF in less than three hours, current plans likely double the time. Instead, the real focus seems to be connecting sprawling population centers in outlying, more affordable areas, with job centers. San Jose to Madera and Burbank to Lancaster and the High Desert are two such examples. Instead of reducing CO_2, HSR may induce new sprawl in remote locales that require more driving and air conditioning.



High Desert Development

California's spectacular high desert boasts oceans of wildflowers, boundless views, and tremendous botanical resources. Now it is the focus of integrated development efforts with the WaterFix paving the way for developers to build thousands of new homes in this sweltering landscape. LA, Kern, and San Bernadino Counties are approving industrial-scale solar and wind projects at pristine wildflower sites to power the air conditioners residents will require for survival. The scenic Hwy 138 is proposed for widening, and the HSR train is planned to transport these commuters into the LA Basin.

Basemap by Jason Barnes • Graphics by Michael Kauffmann

In Appreciation
Legacy in Action – A CNPS Family Affair

For many of us, a love of native plants is born of personal experience, the "ah-ha!" moment at the intersection of nature and intellect when a garden becomes part of an ecosystem and a love of place reveals the rare, but threatened biodiversity we enjoy here in California.

For others, perhaps the love is also familial. From time to time, a seed planted in one generation of a family grows and blossoms in the next. Today, with more than 50 years of history as an organization, CNPS is privileged to witness legacy in the making when one generation's example of giving directly inspires the next generation to do the same.

We want to thank *all the families* who are building a future for CNPS through planned gifts and other acts of foresight. Two great examples of legacy in action are the Rowntrees and Hopkins families. As you read their stories, we encourage you to consider how you too might impact CNPS for years to come.

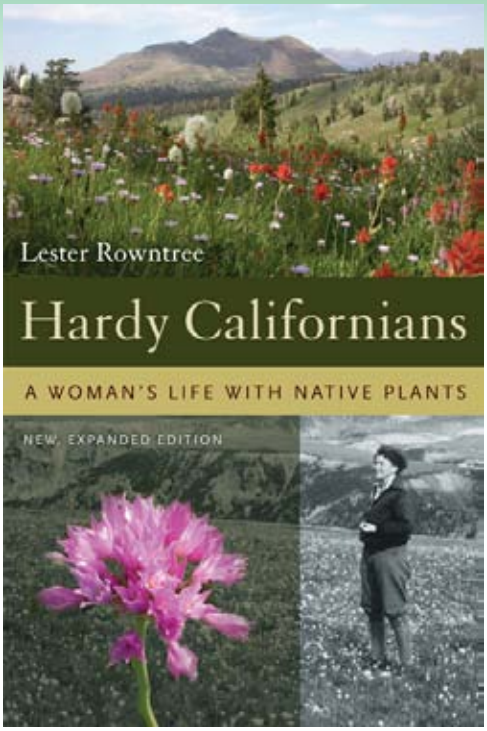
Lester and Les Rowntree

Lester Rowntree, the renowned self-taught naturalist and original "California Native Plant Woman," was born Gertrude Ellen Lester, and took her surname as her given name when she began writing professionally in the 1920s after marrying Bernard Rowntree. Her grandson, Lester Rowntree, or Les, was named after this extraordinary plant pioneer.

The elder Lester Rowntree wrote two books, including the seminal *Hardy Californians*, more than 700 articles, and four children's books. When CNPS was founded in 1965, the group gave Lester the honorary title of Lifetime President of the Society. Among the many honors she received in her lifetime this meant the most to her, says her grandson Les.

> "CNPS, quite simply, is part of the Rowntree family DNA.

Today, Les has realized the legacy of his name both professional and personally. Les is an environmental geographer, conservation biologist, teacher, and writer, now semi-retired. Today, he donates his efforts to nonprofits that address the world's environmental and political problems. The Rowntrees also have donated rights and are helping



to underwrite the costs to re-publish his grandmother's books. He says that CNPS meant the world to his grandmother and that he continues her legacy of support because "CNPS, quite simply, is part of the Rowntree family DNA."

Natalie, Tom, and Julie Anne Hopkins

Anyone who has ever wanted to go back to school and launch a new life chapter, can appreciate Natalie Hopkins' story of embarking on her botany degree in her late 40s. Hopkins, A CNPS fellow and former board member, earned her Bachelor's and then Master's at midlife, and went on to lead the effort to digitally catalogue 15,000 plant specimen sheets under her mentor, CNPS Fellow Carl W. Sharsmith at San Jose State. Following the death of Dr. Sharsmith, Natalie became curator of the Sharsmith Herbarium, where she served until 2000.

Yet Hopkins' path—and ultimately her generosity—likely resonate most deeply for women in the field today. Not only did she contribute largely to the native plant community, she also paved the way for other women to do the same through an endowment from

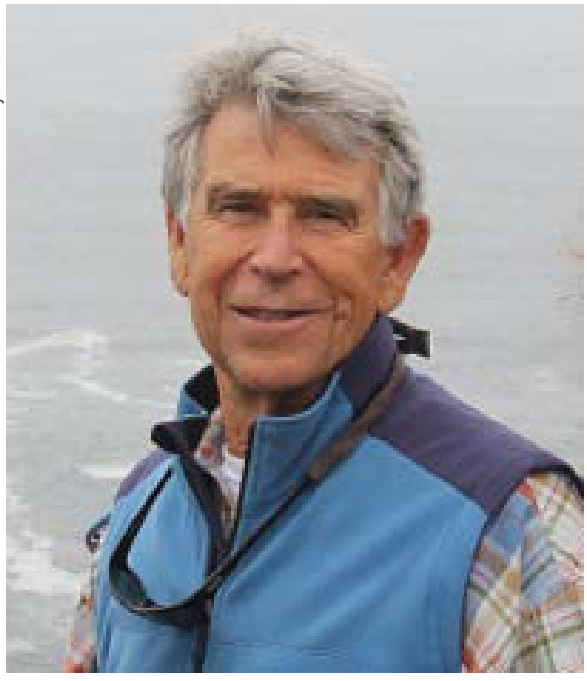

Photo by Marie Price


Photo by Rowan Rowntree

Les (left) and Lester Rowntree.



Thomas and Julie Anne Hopkins. Photo courtesy Hopkins Family

her estate. Thanks to Natalie's foresight, CNPS is able to select a handful of outstanding women each year to receive the Natalie Hopkins Award grant in native plant research.

Hopkins' son Tom says he was raised to appreciate wild places and the interconnectivity of nature. The Hopkins spent weeks in the summer in the northern Sierras, and visited the ocean and the deserts. Both parents were active hikers and self-taught naturalists. Though he did not pursue biology as a profession, he worked for two years as a horticultural apprentice on Alan Chadwick's student garden project at UCSC in the late 1960s. After an early retirement from the construction industry, Tom threw himself full-time into wilderness conservation as co-founder and board president of the Ventana Wilderness Alliance (VWA). (VWA has partnered with CNPS on a number of Rare Plant Treasure Hunts.) "Preserving our native plant communities is an essential part of preserving life on Earth as we know it," he says.

Today, Tom is an ongoing supporter of CNPS and his wife Julie Anne is deeply involved in the CNPS Bristlecone Chapter. "I didn't become the botanist my mother wanted me to be, but I seemed to have married one," jokes Tom.

— Stacey Flowerdew

Thank you to all the generous supporters who make the CNPS mission possible. Together we can leave an invaluable legacy for our children and generations to come.

Intimidated by Planned Giving?

Planned giving is a great way to give more than we may think possible, but many of us feel a bit overwhelmed by the idea of it. Even CNPS Executive Director Dan Gluesenkamp confessed to that feeling until Elizabeth Schwartz's planned gift showed him it could be as simple as making CNPS one of the beneficiaries to a retirement fund. Today, Schwartz's gift has been used to establish the Elizabeth C. Schwartz Fund, which will enable CNPS to hire a Southern California conservation analyst. You can make your own contribution by helping us match that fund or by taking the leap into a planned gift of your own. For more information, please contact Dan Gluesenkamp (**dgluesenkamp@cnps.org**) to set up a call or request a helpful estate planning kit.

Congratulations 2016 Student Research Scholarship Recipients!

Supporting students and training the next generation of conservation scientists is key to the CNPS mission, and so each year CNPS awards dozens of scholarships to student researchers advancing science and scholarship focused on California's native flora. Thanks to generous donors to CNPS, this year we were able to award $7,000 in scholarships. Please join us in congratulating this year's worthy recipients, and in thanking all the CNPS supporters who make our current and future work possible!

2016 Recipients	Research Focus	Supporting Fund
Danielle Black	Identifying the genetic basis of serpentine tolerance in the California endemic species: *Aquilegia eximia*.	Helen Sharsmith Grant
Anita Cisternas Fuentes	Effects of increased inbreeding in *Clarkia breweri* and *concinna*. Are the effects on fitness related to their main pollinator?	Natalie Hopkins Award
Julia Harencar	Secondary contact in cryptic goldfields (Lasthenia): A case of reticulate evolution?	Helen Sharsmith Grant
Jaspreet Kaur	Spatial and temporal dynamics of *Piperia cooperi* mycorrhizal associations in response to microhabitat and soil microbiome.	The Hardman Native Plant Research Award
Amberlee Mahaffey	Factors affecting the lower elevational range of *Juniperus californica* in the northwest Sonoran Desert.	Doc Burr Grant
Natalie Rossington	Predicting the impacts of climate change on the evolution of common and rare *Streptanthus* species using geographic variation in adaptive traits.	Natalie Hopkins Award
Julea Shaw	Utilizing prescribed burns with strip seeding to restore California native grassland communities.	Natalie Hopkins Award

Apply Now! Applications for 2017 grants are being accepted now through September 30, 2017.
Go to www.cnps.org/education-grants.

Plant Exploring: San Gabriel Mountains continued from page 1

corridor—serving as the recreational backyard for millions of Southern Californians.

This range is the landmark feature of the Angeles National Forest, which also includes the Sierra Pelona Mountains. The San Gabriels offer critical habitat for many endangered and sensitive animals including Nelson's Bighorn sheep, California condors, spotted owls, and mountain yellow-legged frogs. Plant communities here provide refuge for 76 species considered rare, threatened, or endangered.

In 1998 I first saw a bighorn sheep in the deepest canyons of the Sheep Mountains Wilderness while pursuing bigleaf-maples in all their yellow-fall wonder. The rams were rutting and the cracking of their horns echoed through maple-lined Fish Canyon. It was at that moment that I forever fell in love with the San Gabriels.

Shaun and RT Hawke are two of my mentors in learning about the natural history of the San Gabriel Mountains. While teaching together at the Los Angeles County Outdoor Science School, they introduced me to many of the region's unique plants, animals, and places. Adventures to Mount Williamson and hikes along the Pacific Crest Trail inspired me learn more about the unique flora and fauna of the mountains. They were also9 the first to pique my interest in CNPS. RT and Shaun are long-time members of the San Gabriel Chapter and over the years have volunteered as field trip leaders and rare plant monitors.

Jane Strong, another member of the CNPS San Gabriel Mountain Chapter, has also had a long-term love affair with the range. She first connected to the mountains as a fire lookout on Vetter Mountain. After her retirement in 2000 she set a goal to "Learn all the plants in the San Gabriel Mountains between Angeles Crest and San Antonio Canyon."

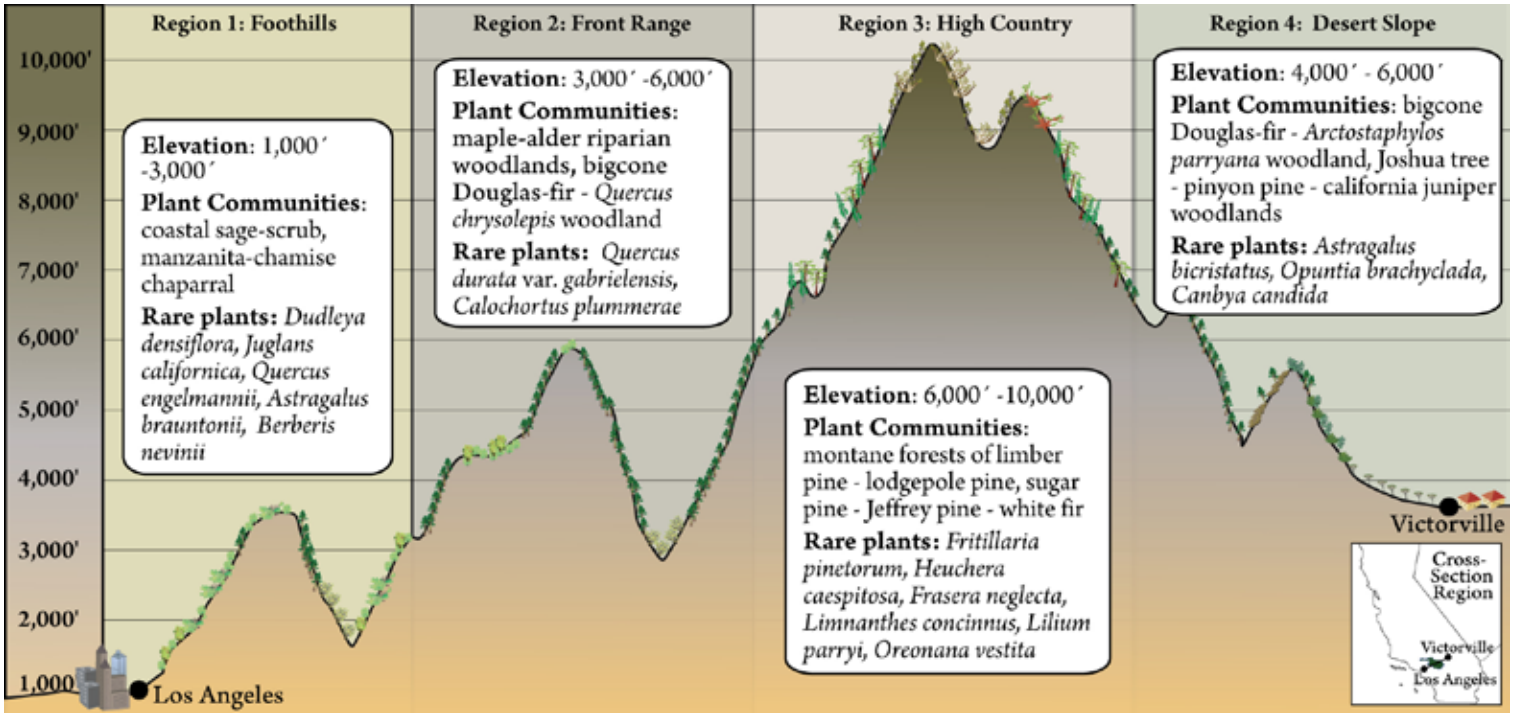
Her quest began by volunteering as a leader for natural history hikes while working as a docent at the Mt. Baldy Visitor Center. "My favorite experiences have been leading field trips for the CNPS San Gabriel Mountain Chapter." says Strong. "Our hikes are always focused on rare plants, butterflies, and new places to explore. There are so many wonderful plants to see and places to go in these mountains."

After the 2002 Curve Fire, which occurred in the high elevations of the San Gabriel Mountains, a CNPS San Gabriel Chapter team formed including Jane Strong, Walt Fidler, Jane Terril, and Graham Bothwell. This powerhouse group set about monitoring and documenting the Lily Spring Area. *Fremontia* readers (Vol. 41 No. 2) will remember the study comparing plant populations and flowering times observed in 2011 with those published 30 years earlier. This is citizen science at its finest!

The team was worried that several years of drought, coupled with increasing temperatures, would convert forest to chaparral after the fire. However, Jane Tirrell has continued to monitor the site. In summer 2016 she found lodgepole pines (*Pinus contorta* subsp. *murrayana*) and Jeffrey pines (*P. jeffreyi*) repopulating the post-fire montane chaparral consisting mainly of mountain whitethorn (*Ceanothus cordulatus*) and chinquapin (*Chrysolepis sempirvirens*). The forest appears to be returning.

In 2015, I returned to work with CNPS and the Angeles National Forest to initiate a mapping and inventorying project for bigcone Douglas-fir (*Pseudostuga macrocarpa*). I have had time to reflect on the scientific journey and understand, even more, the beauty and importance of the San Gabriel Mountains.

Michael Kauffmann
CNPS North Coast Chapter



Ecological cross-section of the San Gabriel Mountains. Graphic by Michael Kauffmann with help from Jane Strong and RT Hawke.

In the Garden

How to Ditch the Lawn

Introducing, **In the Garden**, a new column addressing frequently asked questions and challenges for native plant gardeners. In this issue, we're starting with the basics of lawn removal, featuring **Kathy Kramer,** a long-time CNPS member, native plant gardening instructor, and founder of the Bringing Back the Natives Garden Tour in the East Bay.

Are you ready to convert your lawn into a native plant garden, but unsure how to get started? These six steps will help set you up for success:

1) **Explore Lawn Rebate Options** – Contact both your local water district and Save Our Water (SaveOurWater.com) and check out their lawn removal rebates. Even if your lawn looks bad and hasn't been watered in years, you may still qualify for a $2 per square foot rebate.

2) **Sheet Mulch** – If you've applied for a rebate, don't start work on your lawn until you've received approval from both your water district and Save Our Water. When you have approval, sheet mulch your lawn. (This means cover it with cardboard and wood chips.) Your lawn should be left to sit for three to five months; during this time the lawn will die, the cardboard will begin to break down, and your soil will be improved.

3) **Get Inspired** – While your lawn is decomposing, take the opportunity to learn about native plants. Get inspired by visiting private native plant gardens during any of the native plant tours that take place in April and May (see page 15). These tours give you the chance to get ideas for home gardens, see plants that appeal to you, take photographs, meet designers, talk with homeowners about their experience, attend talks, and more. If you missed garden tour season, visit botanic gardens that have native plant sections. CNPS' CalScape.org is a terrific way to find out what plants are local to your area and identify plants that match your criteria for desired water use, light, soil type, flower color, and more. Use the helpful plant list builder to create your personal wish list of plants best suited for your location and view shared lists and photos from other gardeners.

4) **Get a Consultation** – A knowledgeable native plant garden designer can often save you money in the long run by helping you choose plants most likely to thrive, thus setting you up for success. Even if you know you want to design the garden yourself, a professional can review your plan to ensure that you have grouped plants that have the same water and light needs, and that you have selected plants for their mature size, not the size they are in their four inch pots. Contact your local CNPS chapter or native plant nursery for recommended designers.

5) **Plan Your Irrigation** – Once you have your planting plan it's time to develop your irrigation plan. An irrigation supply store might develop a plan for you at no charge if you purchase your materials from them. (Just bring in your planting plan, and a sketch or photographs of your garden.) Or, an irrigation contractor can do this for you. Make sure that you or your irrigation contractor install the irrigation before you plant, so you are not squashing your plants when the drip system is being installed.)

6) **Plant in the Fall** – Fall is the perfect time to get your plants in the ground. The days are shorter and cooler, and the rains can help your plants become established.

7) **Enjoy!** – Last, enjoy the butterflies, bees, and birds that will come to visit your garden for the seeds, berries, nectar sources, nesting material, and shelter you will have provided them.

Kathy Kramer
CNPS East Bay Chapter

Kathy founded and coordinates the Bringing Back the Natives Garden Tour:

www.bringingbackthenatives.net

This is held in the East Bay each May.

Share your **In the Garden** success story with us: **cnps@cnps.org**



Photo courtesy of Kathy Kramer

Kathy Kramer in her garden.

Kids Corner

Get Outside and Lead a Solo Walk

We often asked students if they can guess what the loudest animal on Earth is. Initial responses often include anything from whales to elephants to monkeys. Few suspect that human animals are the loudest. This then becomes the challenge—can we stay quiet while on a hike in nature?

A quiet solo walk can be an important and impactful event for nurturing a child's connection to the natural world. Observations from a walk along a nature trail can last a lifetime and those are enhanced by time walking alone—listening to sounds, watching for colors, or the movement of birds. This provides an opportunity for deeper connection. It also offers time for self-reflection and asking questions about the world around us.

Download our student and field-tested cards from the CNPS website. They are designed to enhance a child's wonder, connection to, and understanding of, plant life in the natural environment.

> "The real voyage of discovery consists not in seeking new landscapes, but in having new eyes."
>
> –Marcel Proust



Photo by Allison Poklemba



Photo by Allison Poklemba

This guided walk can further develop a child's connection to native plants. Depending on the target age groups, cards can be as simple as indicating the presence of a nearby flowering plant, or as detailed as having the participant find a fallen woody female catkin from an alder and then take time to examine it.

Design your own cards that fit the specific environment you will explore, focusing on the native plants in your area and share them with us!

Denise Newman and
Allison Poklemba
CNPS North Coast Chapter
cnps.org/education/nature-connection

Keys for a successful solo plant walk

- Find a safe trail without spurs for at least 500 meters. Set clear verbal expectations and restate them on the first card with suggestions like "*Go solo and silent*" and "*Leave cards where you find them*."
- One adult stays with the kids while the other leaves first, laying down the cards at appropriate distances.
- Dismiss hikers at one minute intervals, encourage them to use all their senses, and have one question to ask the group once the group reunites. Plan to have a quiet activity to keep the group busy while they are waiting to be dispatched. Similarly, plan to have a quiet reflective activity (drawing, scavenger hunt) for those who have completed their walk and are waiting for the whole group to return.

Calendar

Spring is an exciting time for California's native plant lovers. Don't miss this year's upcoming plant sales, garden tours, and California Native Plant Week activities. For more detail on these events and others, please visit your local chapter website or the CNPS events calendar at **www.cnps.org/events**.

Garden Tours		Plant Sales and Wildflower Shows	
April 1	San Diego - Garden Native Tour - San Diego Chapter	**March 25**	Sacramento Chapter
April 8	Orange County - California in My Garden	**April 1**	Marin Chapter
April 8	Sacramento - Gardens Gone Native	**April 1**	El Dorado Chapter
April 8	South Coast Chapter Garden Tour	**April 7**	Napa Valley Chapter
April 22- 23	Santa Clara Valley & Peninsula – Going Native Garden Tour	**April 6 - 8**	Shasta Chapter
April 29	Shasta Chapter Garden Tour	**April 14 - 16**	Monterey Chapter Spring Wildflower Show
May 7	East Bay - Bringing Back the Natives	**May 6 and 7**	Native Plant Extravaganza Plant Sale - East Bay
May 13	Milo Baker Chapter Ecofriendly Garden Tour	**May 6 and 7**	North Coast Plant Sale and Spring Wildflower Show
June 3	Bristlecone Chapter - Eastern Sierra Land Trust		

Native Plant Week Activities (April 15 - 23)

More events and ways to celebrate will be added weekly. For the latest, visit www.cnps.org/events or follow us on Facebook.

April 15	LA / Santa Monica Mountains Chapter	Native Plant Week Symposium, wildflower show, and plant sale
	Marin Chapter	Field Trip: Mount Hamilton
	Marin Chapter	Talk: "Spring Wildflowers of Marin" with Doreen Smith
	Sanhedrin Chapter	Guided Hike: Twining Ranch Flowers
April 17	Marin Chapter	Guided Hike: Wildflowers at Chimney Rock with naturalist Shannon Burke
April 18	Marin Chapter	Workshop: Growing Native Plants from Seed with Charlotte Torgovistsky
	Sanhedrin Chapter	Talk: "A Puzzler's Guide to Restoring California Inland Prairies" with Dr. Paul Aigner
April 20	Marin Chapter	Guided Hike: Wildflowers of Mt. Burdell with naturalist Shannon Burke
	Marin and Milo Baker Chapters	Field Trip: Soulajule Jewels and Ghouls, West Marin
	Marin Chapter	Volunteer: Invasive weed removal, Point Reyes National Seashore
	Milo Baker Chapter	Field Trip: Lake Soulajule, Marin/Sonoma border, with Suzanne Whelan, MMWD
April 21	Marin Chapter	Talk and Book signing: "Wildflowers of California's North Coast Range" with photographer and author Reny Parker, San Rafael
April 22	Marin Chapter	Celebrate: Earth Day Celebration, Samuel P. Taylor Park
	Marin Chapter	Guided Hike: Wildflowers of Gary Giacomini Open Space Preserve with naturalist Shanon Burke, San Geronimo
	Milo Baker Chapter	Field Trip: Vernal Pools with Michelle Halbur, Pepperwood
	Monterey Chapter	Celebrate: Earth Day at the Hilton Bialek Habitat
	Sanhedrin Chapter	Anderson Valley Wildflower Show
	Sacramento Chapter	Guided Hike: Humans Shaping the Land Botany Hike at Deer Creek Hills
	Shasta Chapter	Celebrate: Whole Earth and Watershed Festival
	North Coast Chapter	Guided Walk: "Native Plants in Garden and Forests" with Carol Ralph, Pete Haggard, and Anna Bernard
April 23	South Coast Chapter	Volunteer: Point Vicente Interpretive Garden Maintenance

CALIFORNIA NATIVE PLANT SOCIETY
BULLETIN
2707 K STREET, SUITE 1
SACRAMENTO, CA 95816-5113

The California Native Plant Society is a statewide, nonprofit organization of amateurs and professionals with a common interest in learning about and preserving California's native plants and plant communities. Membership is open to all. Visit cnps.org

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- Student Scholarships
- Kids Corner: Plant Walk
- Replacing Your Lawn
- What is a Geophyte?
- De-Extinction project
- Conservation Update: IPA

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for details