Conservation in Action

All Hands ECOLOGY

Fall 2026



"It's on us to learn how to prevent conflict"

— Carolyn Whitesell,Human-Wildlife Interactions Advisor, UC Cooperative Extension

Quinton Martins/True Wild Conservation

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Tilting the odds

A steady stream of alerts about the coming El Niño — the most influential climate driver on Earth – seems to indicate high probability that Californians will experience a very wet winter, with localized flooding, storm surges, and even a months-long rise in sea level from an associated Kelvin wave. The science behind this prediction is strong, and yet, of course, science can't say with certainty that we'll all need to batten down the hatches.

That is not how science works. Science is not an endpoint; it is a process — a continuing exploration of mysteries.

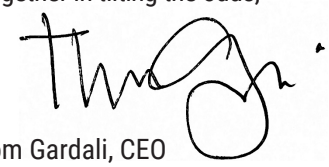
At All Hands Ecology, we need to make decisions, big and small, every day. We realize we'll never have complete information, so we tilt the odds: we do the groundwork that gives us an edge before deciding. This means we pay attention to both data and lived experience so we can be prepared.

Tilting the odds is in much of what we do. For example, with El Niño predictions this year, we'll be doing our best to prepare our lands for lots of rain and flooding by addressing erosion, doing tree work, stabilizing berms and bulkheads, revisiting our emergency plans, and so much more.

You'll also recognize this approach in the stories on the following pages.

Caring for the lands and waters that care for us is a privilege. It takes a lot of time and resources, and we are grateful to you all for supporting us.

Together in tilting the odds,



Tom Gardali, CEO



Volunteer with us!

Help is needed counting birds on Tomales Bay, checking critter cams in Sonoma, sharing science with kids, and caring for the land.

allhandsecology.org/volunteer/ →



Photo: Catie Clune



Our Strategic Plan for Resilience includes reconnecting tidal flow within this salt marsh on the southeast shore of Tomales Bay.
Photo of Marks Marsh by David Lumpkin.

Planting seeds of stewardship

by Anne C. Mitchell, communications manager

For docent Lauran Hawker, guiding third graders at Bouverie Preserve begins before the first discovery is made.

“We start by talking about what this preserve is for. I say, ‘This place is for you. You are now the stewards of this land.’ We talk about what it means to be a steward.”

From the beginning, students are invited to see themselves as belonging on the land, with their own curiosity helping shape the day. In our school programs, we are not simply creating memorable experiences or sharing information about nature. We are helping lay the foundation for lifelong appreciation and stewardship by fostering joy and kinship with the natural world.

A joy-centered approach

“If our goal is to empower young people to care for this planet, it begins with a sense of belonging,” said Catie Clune, director of education. “We create opportunities for young people to develop their own emotional, relational, and sensory connections with nature. It’s a joy-centered approach that can leave a lasting impression.”

For Hawker, a docent of eight years and former schoolteacher and principal, this approach feels natural.

“Children are not empty vessels,” said Hawker. “They are the leaders of our adventure.” Hawker makes space for the students to co-create the day.

Opportunities for curiosity

Carla Terre, a field trip chaperone and parent of a third grader last fall, was deeply impressed by this approach.

“Whatever caught their eye, Lauran was able to seamlessly interact with them about that thing,” said Terre, “asking questions that were open-ended to elicit their interest.”

Terre was particularly touched by seeing her son excitedly sharing his knowledge.

“He had all these answers to questions that I had no idea he knew,” Terre recalled.









Above: School kids check out animal bones found on the preserve. Far left: Docent Lauran Hawker invites students to discover what is living under a rock and, left, on its surface. Photos, above and far left: Carla Terre.

From inquisitiveness to inquiry

"Centering joy and engagement in education naturally complements the teaching of science," Clune shared.

Docents guide students through activities like turning over logs to discover insects, drawing the undersides of leaves, and thinking about habitats as homes. These moments are playful as well as scientifically meaningful, inviting students to observe carefully, think ecologically, and develop a deeper respect for living systems.

Hawker noted an evolution in the education program over the years that's "less front-loaded with information."

"We're still weaving in biomes, tracks, skulls, and mountain lions," said Hawker, "but there's more child-led discovery."

Lasting impressions

At the end of field trips, Hawker is amazed by what the kids say.

"When they return, they have a deeper connection," she said. "They fall in love with this place."

For Terre, the field trip also left a lasting impression.

"Lauran came over to me and said, '"I think you have a budding naturalist,'" Terre recalled. "Now I can bring it to life outside the field trip by supporting his interests."

Ten years studying — and marveling over — the lives of North Bay mountain lions

by Wendy Coy, director of communications





P33, above left, nurses her three kittens in the Sonoma Valley, February 2026. Photo: Quinton Martins, True Wild Conservation. Community Lion Ambassadors, above right, get acquainted with the GPS data of several lions. Photo: Anne C. Mitchell.

Ask AI to describe field research and you're likely to get something akin to "gathering raw data outside of a laboratory, library, or office setting."

Ask Dr. Quinton Martins, and you'll get a story with a mountain lion at its heart. Martins, our collaborator on the Living with Lions project, has collected dozens of stories from the field — awe-inspiring, tragic, humbling, and enlightening — that when strung together, form a broader narrative of mountain lions in the North Bay.

Tracking elusive, far-ranging big cats

Martins leads the project's collaring and tracking efforts and was in the field trying to track down a male lion whose collar had stopped transmitting GPS signals. "Trying to recapture him was going to be a challenge — I could only attempt to find him using VHF radio telemetry," Martins explains. After being alerted to his whereabouts by a Glen Ellen resident with a backyard trail camera, Martins set out to find him, guided by a faint radio signal. "Going into the site was a little disconcerting as I knew I was clearly very close to him in thick bush," he recalls.

Martins inched forward through an opening in the underbrush only to find P53 lying dead. "There were no signs of injury, and he seemed to have been dead for about a week," Martins says.

He reported the death to California Department of Fish and Wildlife (CDFW) and arranged for a necropsy, or post-mortem examination, in Sacramento.

Mountain lion deaths linked to domestic cat disease

This was not the first time Martins had come across a deceased mountain lion. As part of the research, we record births and deaths of collared lions and their offspring. The North Bay deaths had aligned to what



Male mountain lion, P60, recorded on a Marin County path, August 2026. Photo: Quinton Martins, True Wild Conservation

Living with Lions is a collaborative project between True Wild Conservation and All Hands Ecology

was happening statewide: human-wildlife conflicts are leading factors, with depredation, illness, and car strikes at the top of the list.

But in early 2024, five collared Sonoma Valley-based lions died in quick succession without outward signs of distress. Necropsies and further testing revealed that four of these lions tested positive for Feline Leukemia Virus (FeLV) — one of the most common diseases to affect domestic cats and a growing threat to the world's wildcat and puma populations. The lions had succumbed to illnesses due to compromised immune systems.

Diet study and cameras provide more detail

A nearly 10-year tally of carcasses left behind by collared lions provided a clue about the die-off: while deer make up nearly 75% of their diet and unsecured livestock account for another 11%, domestic cats make up about 4% of mountain lion meals (and this number is likely low as such small prey are less likely to be discovered).

Turning to nearby trail camera footage, Trail Camera Project Manager Kate Remsen looked at photos from several Sonoma Valley sites. "The first set of images missing mountain lions didn't raise any alarms because these animals are far-ranging. But when we collected data over the course of the next six months and still no lions, it seemed the cameras were telling the same story as the collars: something wasn't right," she recalls.

Running the numbers, Quantitative Ecologist Scott Jennings found a 40% drop in lion sightings on the trail cameras compared to the previous four years.

Martins suspects P53's death in February was related to the 2024 deaths: "He was diagnosed as FeLV-positive when we captured him, so this was possibly the reason for his demise," adding that, currently, health-related mortalities have surpassed depredation related mortalities in our study area.

These findings have been shared with CDFW and other researchers looking into the connection between lions, domestic cats, and the spread of feline leukemia virus.

Expanded study area plus research on road crossings and fuels reduction

During the course of tracking Sonoma County's lion population, we saw a young male disperse into Marin County in search of territory of its own. So, in 2026 our study expanded to learn more about Marin's lion population. We are currently tracking an adult male, P60, who was collared near Lagunitas.

We are also working to understand the connections between where lions successfully cross roads and the characteristics of vegetation and infrastructure. Looking at data from 22 GPS-collared mountain lions between 2016–2023, project lead Jennings found obvious crossing hotspots where individual lions crossed almost once per month as well as some hotspots that weren't identified in previous connectivity plans. "Sections of Highway 12 and Arnold Drive seem to be important for mountain lions where connectivity across Sonoma Valley may be limited," Jennings says.

Preliminary findings led to collaboration and data sharing with Sonoma Land Trust, Caltrans, and Pathways for Wildlife to further evaluate Highway 12 and Arnold Drive crossings.

Just getting underway is a study at the intersection of lions and fire. As Californians expand efforts to reduce wildfire risk by creating defensible space, we'll use our lion movement data to examine how different defensible-space scenarios could affect lion habitat in the North Bay.

A living, shifting collaboration between people and place

While research and analysis continue, School Programs Manager Liz Martins and dedicated volunteers continue to build bridges between lions and people. In classrooms and community gatherings, Lion Ambassadors bring the stories of lions to life — sharing the program's research findings, the role of lions in the ecosystem, conservation challenges, and strategies for coexistence.

"As we hit the 10-year mark for this collaborative project, we want our work to be practical, addressing specific issues in ways that offer tangible solutions," says CEO Tom Gardali. "It is easier to maintain a population than to recover one, so our collective actions for North Bay lions now are good investments for the future."



Program highlights

60 adult & juvenile lions / 36 kittens | Lions collared and/or DNA-tested for the study (includes living and deceased) plus number of untagged kittens observed in dens born to collared females.

15,446 | K-12 students engaged in Our Wild Neighbors classroom and assembly presentations since 2017.

72 | People trained as Community Lion Ambassadors

179 | Backyard trail cameras collecting images (*7 million+* images to date), contributing to a growing understanding of wildlife movement and density in neighborhoods throughout Sonoma and Napa

7 | Research articles that include contributions from the Living with Lions study

Simple changes at home can improve the odds for wildlife



Keep cats indoors and farm animals housed at night

An indoor cat is a win for wildlife and safer for the cat. Try a catio for secure outdoor enrichment. Bring pets and livestock in at night; secure small farm animals, including goats and sheep, in predator-proof nighttime housing.



Remove fencing or replace with wildlife-friendly options

The best option for wildlife is open habitat with no fences; when necessary, avoid fences that are too high to jump, too low to crawl under, difficult for fleeing animals or birds to see, or create a complete barrier.



Slow your roll; stay alert

Drivers and animals are at risk of injury or death when wildlife enter the roadway. Staying within the posted speed limit may allow drivers to avoid a collision. Fall and spring all are especially risky when bucks are rutting and small wildlife are looking for mates.



Connect with local organizations

Conservation organizations have a range of resources to help folks coexist with wild neighbors. Stay connected and magnify the benefit to wildlife by joining a mailing list, volunteering, sharing links with friends and family, or providing financial support.

All photos: Living with Lions Trail Camera Project

Extra: Q&A with Human-Wildlife Interactions Advisor Carolyn Whitesell
online at allhandsecology.org/blog/ →

Photo: Kate Remsen

Innovations in conservation grazing at Modini Preserve

by Anne C. Mitchell, communications manager

It might sound like a scene from the future: Cows wearing solar panels in a pasture with invisible fences. At Modini Preserve, this is the new reality of grazing.

This year, we partnered with Brent Sullivan, owner of Circle S Cattle Company in Geyserville, replacing barbed wire with emerging technology, benefiting both conservation and agriculture.

An uphill battle

"The number one reason for us to use virtual fencing is that you don't have to deal with fences," said Michelle Cooper, Modini Preserve resident biologist and preserve manager.

Fencing at the preserve comes with challenges. It's costly and labor-intensive, particularly across steep terrain. More than half of the preserve has slopes greater than 60 percent, with elevations ranging from 400 to 2,800 feet.

The 2019 Kincade Fire damaged nine miles of fencing, which is expensive to replace. Fencing can also impede wildlife movement as animals cross the landscape.

Despite these difficulties, Cooper believes in managed grazing to care for the preserve's grasslands.

"Grasslands need disturbance, like managed grazing, to prevent shrub and tree encroachment and reduce coverage of invasive plants," Cooper explained. Reducing unwanted competition encourages a teeming network of plants and animals.

Shifting paradigms

In 2025, after receiving funding to make upgrades at the preserve for cattle grazing, Cooper started working with Sullivan and proposed the idea of virtual fencing.



Left: Brent Sullivan, owner of Circle S Cattle Company, and one of his cows outfitted with an eShepherd solar-powered GPS collar. Photo courtesy Brent Sullivan. Below: the 3,000-acre Modini Preserve sits in the Northern Mayacamas Range. Photo courtesy Sonoma County Ag + Open Space.



How does virtual fencing work? The user draws lines on a GPS map to set grazing areas. When a cow approaches the line, the solar-powered collar plays an audio warning tone. If the animal moves past the audio cue, the collar delivers a mild electric pulse, like a traditional electric fence. If the cow advances beyond the pulse zone, an alert is sent to the grazer. According to Sullivan, the cows learned to respond to the audio cue within a week.

"I was immediately interested — virtual fencing is the wave of the future," Sullivan said, adding that the technology allows him to graze lands that were previously unavailable. These include properties impacted by wildfire where fencing was never rebuilt, as well as areas where grapes have been removed.

Virtual fencing could also change Sullivan's business. Cattle grazers pay landowners, who provide fencing and water. With Sullivan supplying the fencing virtually, this arrangement shifts, with Sullivan potentially being paid for the service.

Grazing upgrades were supported by the LandSmart® Phase IV Grazing Program for Community Resilience, funded in part by Gold Ridge and Sonoma Resource Conservation Districts and California State Coastal Conservancy's Wildfire Resilience Program.

Seeing is believing

In 2026, Sullivan and Cooper fitted 13 cows with solar-powered GPS collars. Cooper created virtual pastures on a digital map on her computer using the Gallagher eShepherd application.

By simply looking at her phone, Cooper knew where the cows were, a significant time-saver during welfare checks and roundups.

Another important feature was the heat map. "You could see where they were grazing a little and a lot," Cooper added. "With easy fence adjustments, I could improve grazing distribution."

Using technology in stewardship

Impressed by the ease and effectiveness of the fencing technology, Cooper is looking to expand grazing at the preserve next year.

"We've always known grazing can be an important stewardship strategy at the preserve," said Cooper. "The question has been how to make it work without replacing miles of fencing. Virtual fencing is helping us figure that out."



All Hands Ecology
4900 Shoreline Highway 1
Stinson Beach, CA 94970
allhandsecology.org • 415-868-9244

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A fog belt bumble bee (*Bombus caliginosus)* spotted at Cypress Grove Preserve, Marshall. The fog belt bee is listed as a Species of Greatest Conservation Need. Photo by David Lumpkin.

Learn more at the bumblebeeatlas.org →

Community-Powered Conservation

Even a small yard has the makings for a bumble bee bodega

This past summer, volunteers hit the trails at our preserves with white insect nets aloft as part of a community science project called the California Bumble Bee Atlas, an initiative of The Xerces Society for Invertebrate Conservation. Bumble bees are facing an uncertain future, and this long-term monitoring project, with nationwide implications, is gathering the data needed to track and conserve bumble bees.

But you don't need to go farther afield than your own backyard to make a difference for native bees. Leif Richardson, coordinator of the Atlas and an endangered species conservation biologist, shares about these fuzzy pollinators, the threats they face, and small changes we can make at home to help the humble bumble.

Read in our blog: Tracking the future of Bumble Bees →

Benefit of membership

Conservation in Action, published twice yearly as a benefit to our members, supporters, and volunteers — features our latest stories through captivating imagery, personal reflection, and the science that informs our mission. ***Not yet a member?*** **Join here →**
allhandsecology.org/membership

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