



California Society for Ecological Restoration Quarterly Newsletter October 2019 Volume 29, Issue 2

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Above: Volunteers on Coastal Cleanup Day gather to help clear out trash from George Sardina, MD Preserve. See article on page 5.

Ecesis is published quarterly by the California Society for Ecological Restoration, a nonprofit corporation, as a service to its members. Newsletter contributions of all types are welcome and may be submitted to any member of the board (see page 11).

Testing Clustered Plantings as a High Marsh Restoration Tool

by Karen E. Tanner¹, Kerstin Wasson^{1,2}, Monique Fountain², Alexandra S. Thomsen³, Ingrid M. Parker¹.

Early ecologists focused on competition and predation as drivers of community structure, but today we recognize that positive interactions can also have strong effects on species distribution and performance. Communities actually result from many positive and negative interactions occurring simultaneously (Brooker 2006, Callaway and Walker 1997, Lortie et al. 2004), and the nature and strength of interaction outcomes can often be predicted from their environmental context using the Stress Gradient Hypothesis (SGH) framework. The SGH predicts that negative interactions are more likely to occur under benign conditions, while positive interactions are more likely under stressful conditions (Bertness and Callaway 1994, Callaway and Walker 1997). These predictions are well supported in natural systems (Callaway and D’Antonio 1991, Greenlee and Callaway 1996, Nobel 1980), but have not been as widely tested in a restoration context. However, land managers have begun to consider whether restoration designs that leverage positive interactions can improve outcomes in stressful habitat. Salt marshes are ideal systems for testing whether positive plant interactions ameliorate stress because tides create strong moisture and salinity gradients that can affect plant performance over short distances. There is evidence that clustered plantings improve early survival and growth in intertidal systems (O’Brien and Zedler 2006, Padilla and Pugnaire 2006, Silliman et al. 2015), but long-term studies could reveal whether early benefits of clustering are outweighed as plants mature. If neighbors inhibit each other as they grow larger (Antonovics and Levin 1980, Lara-Romero

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Testing Clustered Plantings *continued*

et al. 2016), or uniform planting patterns stimulate more rapid dispersal and recruitment into unplanted areas by simply occupying a wider spatial extent, early benefits to survival may be outweighed.

At the Elkhorn Slough National Estuarine Research Reserve (Monterey County, California), we have initiated a large-scale clustering experiment at a 61-acre restoration site that will be monitored for years to come. We raised the subsided marsh platform ~2–3 feet on average, using a combination of Pajaro River dredge spoils and soil scraped from an adjoining hillside. The constructed high marsh ecotone is a wide, shallow slope between 1.95 and 2.25 meters NAVD88, increasing carbon sequestration capacity in the system and allowing for future migration of marsh vegetation upslope as sea levels rise. In February 2019, staff and California Conservation Corps crews transplanted ~17,000 seedlings into monospecific uniform or clustered plantings spanning the high marsh elevation gradient (Figure 1). We used monospecific plantings because *Salicornia pacifica* appears to be a strong dominant in this system, and other natives tend to occur in large patches within the pickleweed matrix, suggesting that conspecific groupings confer some kind of benefit.

We are quantifying soil moisture and salinity across the high marsh elevation gradient, and testing whether the performance of five native perennials (*Distichlis spicata*, *Extriplex californica*, *Frankenia salina*, *Jaumea carnosa*, and *Spergularia macrotheca*) differs across experimental planting treatments. Earlier work at the Reserve suggested that high marsh plants are more stressed at high elevation, where Mediterranean summers create drought conditions (Fresquez 2014). If moisture limitation at high elevation is the strongest stressor in this system, the SGH predicts that plant interactions should shift from negative or neutral at low elevations to positive at high elevations. We therefore expected higher survival or growth for clustered plants at high elevation. We also tracked cover of transplants as well as naturally colonizing species (native as well as non-native) across the elevation gradient and planting treatments.

Early survival was extraordinarily high (>94%) for all species regardless of planting pattern,

likely related to high rainfall in winter and spring. Contrary to our expectations, *E. californica* and *S. marina* experienced higher mortality near the bottom of the ecotone, where plentiful rainfall combined with more frequent inundation appeared to exceed waterlogging tolerance. The directional switch in the stress gradient and much higher survival rates than those observed in a drier year (Fresquez 2014) highlight the potential for weather to influence outcomes in this system. By May, plants of all five species showed clear trends of increasing size with elevation, and plants were much larger in the uniform treatment compared to the clustered treatment. We also see more bare ground in columns planted with the clustered treatment, and more transplant cover in uniform columns (Figure 2). These results indicate that competition between plants is the strongest driver of performance at our restoration site during the first year. The lack of elevation effect on interaction patterns suggests

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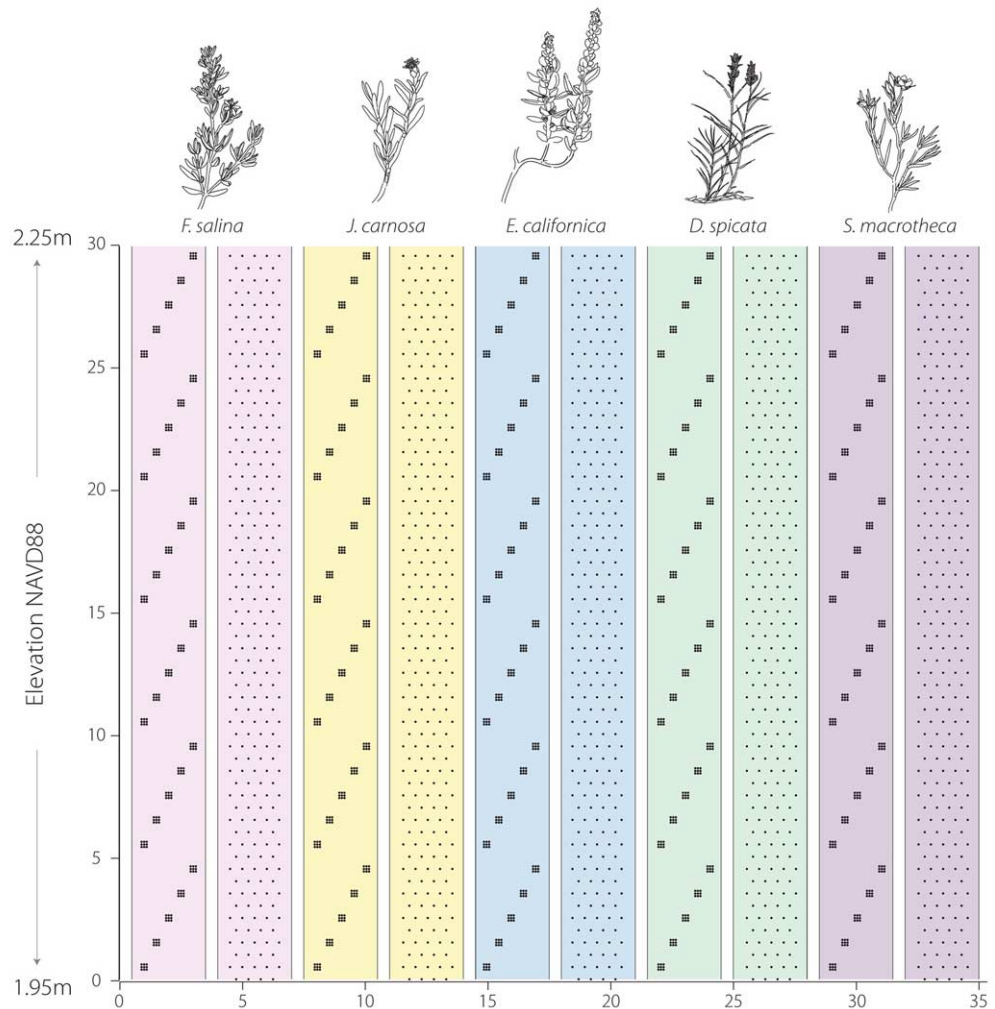


Figure 1. Experimental planting design in a 30 x 35 meter block (n = 6 blocks total at the restoration site). Each block is divided into ten columns, with a pair of columns assigned to each of five species. The same number of seedlings (n = 270) are planted in both the Clustered and Uniform columns. In the Uniform columns individuals are spaced 50 cm apart, and in the Clustered columns groups of 9 individuals are spaced 10 cm apart. *Plant illustrations by Sienna Van Slooten*

Testing Clustered Plantings *continued*

that these five species are unaffected by underlying gradients of moisture and salinity — at least in a high rainfall year. We will continue to track plant community composition in restored areas indefinitely, providing insight into the relative performance of planting patterns over time.



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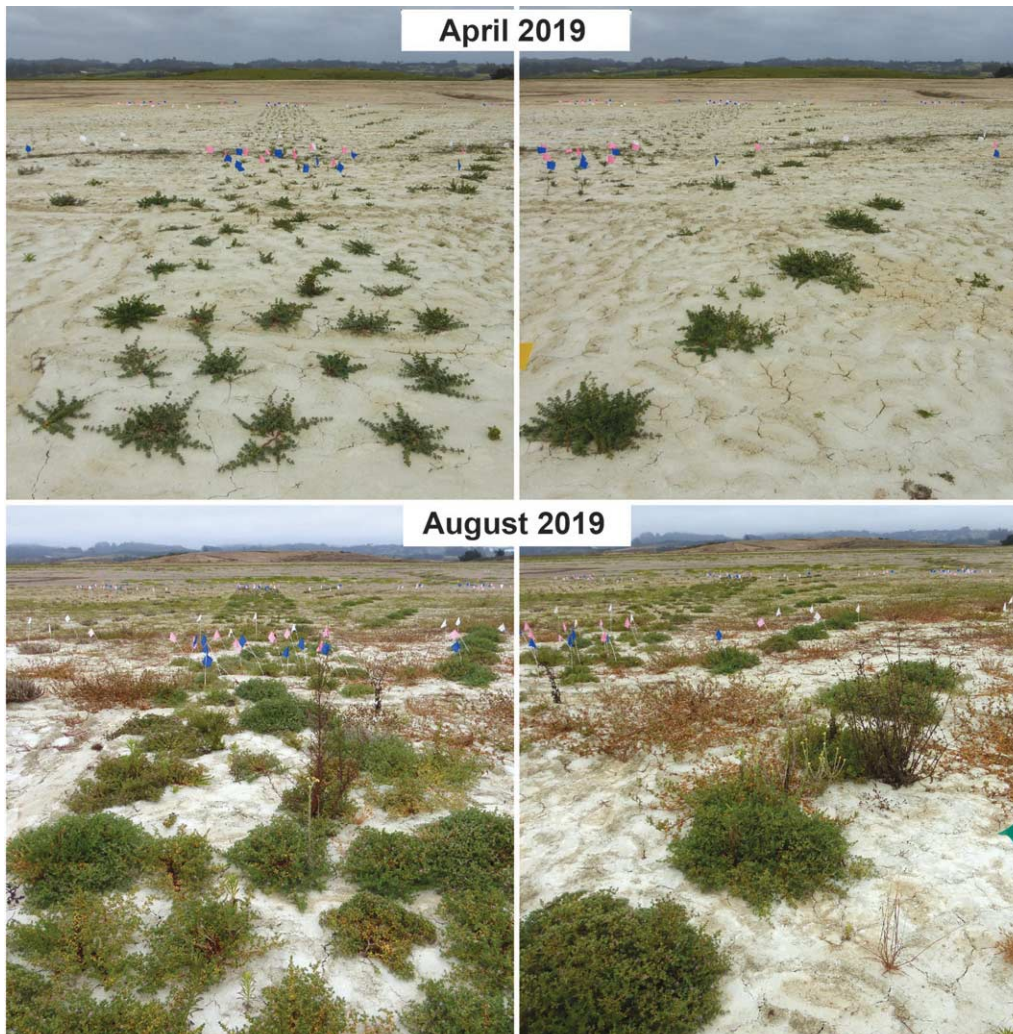


Figure 2. Uniform planting (photos on left) and Clustered planting (photos on right) of *F. salina* over time. When comparing the August photographs there is more *F. salina* cover in the Uniform planting on the left, and more bare soil in the Clustered planting on the right. Pickleweed and other species have also begun to colonize the planted columns. Photos: Karen Tanner, 2019

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Volunteers clearing out pallets left behind from its former use as a paintball recreation area. Inset: Proposed usage map of George Sardina, MD Preserve

Connecting the *Missing Lynx* in North San Diego County

by Nathan Serrato¹

Since 1991, The Escondido Creek Conservancy (Conservancy) has focused its work in North San Diego County to protect land by permanently removing it from the development market. The Conservancy has helped protect over 7,000 acres to date, and currently owns or manages over 3,100 acres of conserved land.

Save 1,000 Acres Campaign

In 2015, the Conservancy began an ambitious land protection project, with a goal of saving 1,000 acres in the northern Escondido Creek watershed, near Daley Ranch and Lake Wohlford. In 2018, with the support of hundreds of donors and key conservation partners, the 693-acre Mountain Meadow Preserve (MMP) was created in Hidden Meadows with the help of the U.S. Navy and San Diego County Parks. In July of 2019, the Conservancy created the 282-acre George Sardina, MD Preserve (Sardina Preserve) near Lake Wohlford. The acquisition of these lands is the first milestone in the Conservancy's larger goal to create a permanently protected, 9+ mile-long wildlife corridor, extending from Highway 15 to the backcountry.

While we are thrilled with these acquisitions, the next stage is just beginning. Much of MMP remains disturbed from its former agricultural use, and the Sardina Preserve was home to paintball and airsoft gun courses that damaged the landscape and tributary creeks on the property. Preliminary restoration planning for both these sites has begun with trash and debris clean-up and non-native plant removal.

Restoration Opportunities at the Sardina Preserve

As paintball and airsoft use were shut down by the creation of the Sardina Preserve, wildlife cameras at the Preserve have picked up use of the land by a wide range of wildlife species, including bobcats, mule deer, and mountain lions. Since the acquisition, the Conservancy's land managers have begun rerouting roads and decommissioning trails away from sensitive habitats like the Engelmann oak forest, and removing props left over from the paintball use, including large wooden pallets and empty barrels. Looking beyond the large structures, one can still see the occasional splashes of pigment left behind by paintballs and the snowy look of white, plastic airsoft pellets scattered on the ground. On Coastal

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Connecting the Missing Lynx *continued*

Cleanup Day this year, a team of enthusiastic volunteers helped remove the remaining pallets and barrels. And although another team took on the task of collecting the tiny, airsoft pellets by hand, removing them all from the property will be a long process.

Mapping of trails and wetland areas is a priority to identify both future restoration areas and areas which might be used for education and outreach. Currently, hundreds of eucalyptus trees dominate the wetland areas and invasive grasses have established themselves in the buckwheat and coastal sage scrub-dominated meadows. The restoration of the Sardina Preserve will provide a refuge for native plants and wildlife, but will also help aid fire prevention as flammable, non-native plants are replaced with native vegetation, which have special adaptations to retain more moisture in the summer months.

The most challenging part of the restoration process will be removing large eucalyptus trees in areas with steep terrain. Because of this complexity, the restoration of Sardina Preserve could take 5+ years to complete. During that time, the Conservancy will engage students and community members so that they can learn the importance of our local ecology and participate in restoration and research projects.

Connecting the MMP and the Sardina Preserve to other protected lands will be a Conservancy focus in coming years as they launch



their newest campaign, “The Missing Lynx.” The Missing Lynx campaign is focused on connecting the links between preserved areas in North County, so that native animal populations are free to roam throughout North County and thrive. Accomplishing this won’t be an easy task, but with the help from donors and volunteers we’re confident that the Escondido Creek watershed will not only provide healthy habitat for plants and wildlife, but also inspire families to reconnect with nature for generations to come.

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As this issue of *Ecesis* goes to press: “Strong winds and dry conditions are fueling wildfires across California, from Sonoma’s wine country to residential areas of Santa Clarita hundreds of miles away. The fierce blazes prompted California Gov. Gavin Newsom to declare a state of emergency in Sonoma and Los Angeles counties Friday, citing destroyed structures and tens of thousands of evacuations.

“Tens of thousands of Californians have been forced to evacuate their homes, and utility companies across the state have cut power to hundreds of thousands of customers in an attempt to stop the spread of the fires. However extreme fire conditions are predicted to continue into the weekend.”

Gunia, A., J. Bates, and J. Aguilar. “California wildfires have engulfed thousands of acres across the state. Here’s a map of all the big blazes.” <https://time.com/5710371/california-wildfire-map-2019/>. Date accessed: 25 October 2019.

CNPS Fire Recovery Guide Available for Download

“When we look at a burned landscape, our impulse may be to clean it up and re-plant it right away,” said Liv O’Keeffe, senior director of communications and engagement for CNPS. “But we’ve got to be patient when it comes to natural and healthy land recovery. In fact, we can unknowingly do more harm than good without the right information.”

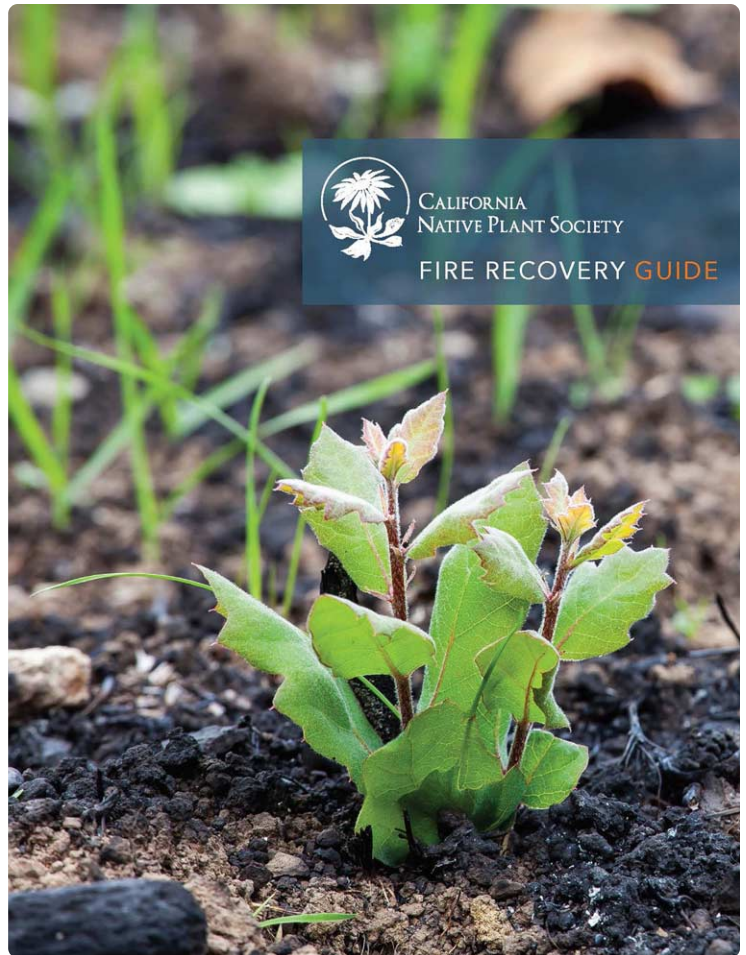
Experts worry about factors like erosion, landslides, habitat degradation, and invasive weeds, all of which can destroy the integrity of local ecosystems and make an area more susceptible to future fire. Common mistakes CNPS sees people make after wildfire include:

Using seed mixes and mulches that include noxious weeds like French broom, cheat grass, and thistles. (These weeds can choke out local plants and quickly grow into what’s known as “flashy fuels” for wildfire.)

Assuming a burned or charred tree is dead. (Large, hardwood trees like oaks can often survive fire as long as their inner tissue is intact.)

Ripping out vegetation and clearing debris too soon. (Many native plants will resprout from their base or underground structures, or re-seed themselves. Removing them can destabilize property, contribute to erosion, and destroy habitat and food sources for nearby wildlife.)

“Clear-cutting” property or other extreme landscaping measures in the hopes of protecting homes. (In fact, experts instead advise people



start with an emphasis on home-hardening like fire-proof building materials and a 5-foot no fuel zone immediately around structures.)

Seeding areas with California poppy mixes. (Seeding is rarely recommended in most burn areas, and even native seeds must be carefully vetted for fragile burn landscapes.)

“Trustworthy, helpful information is a healing balm at a time when our communities are trying to put our lives back together and stay safe,” said Calli-Jane DeAnda, executive director of Butte Fire Safe Council. Butte County’s North Valley Community Foundation helped fund the statewide guide along with the Giles W. And Elise G. Mead Foundation, U.S. Fish and Wildlife Service, Marin and Mount Lassen chapters of CNPS, and individual CNPS donors.

“We’re incredibly grateful to the authors, scientists, and funders who gave us the chance to do something helpful for our friends and neighbors in California,” CNPS Executive Director Dan Gluesenkamp said. “Thanks to them, we’ve been able to provide something of great value that should never have a price tag.”

The California Native Plant Society Fire Recovery Guide is available for download at cnps.org/fire-recovery and in print through participating community partners.



Acacia Removals for Fuel Reduction and Critical Wildlife Habitat

by Cris Sarabia¹ and Megan Wolff² Photos courtesy the authors

The Palos Verdes Peninsula Land Conservancy is embarking on a \$200,000 project, with support from the City of Rancho Palos Verdes, to reduce fuel load and enhance habitat in the Palos Verdes Nature Preserve (PVNP) by removing *Acacia cyclops* invasions. This project augments current City efforts to maintain fuel modification zones near homes by addressing major threats to property and wildlife habitat that are posed by *Acacia* throughout the Preserve. *Acacia* is largely comprised of dry plant matter and volatile resins, makes it highly combustible and hazardous. This project strategy is supported by the Fire Department, and *Acacia* was included in the L.A. County Fire Department's recently published "Ready! Set! Go!" pamphlet as a high-hazard plant.

Hitting the Ground Running

The Land Conservancy identified 38 acres in the PVNP for fuel-load reduction — primarily in Portuguese Bend Reserve — as well as further goat grazing in San Ramon Reserve. Crews began the project on September 9, and the project will be completed in late October

Palos Verdes Peninsula Land Conservancy, 310.541.7613. ¹Conservation Director csarabia@pvplc.org. ²Volunteer Coordinator.

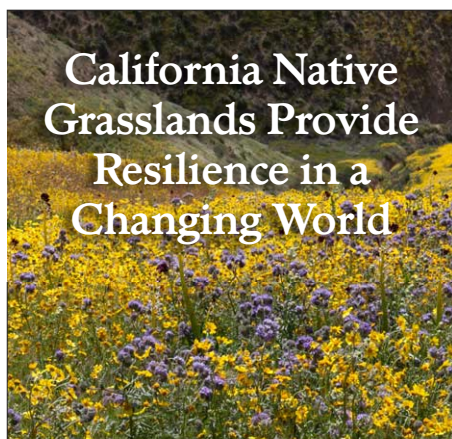
with one-third of an acre of *Acacia* removed daily. *Brassica nigra* and non-native grasses will also be managed with the help of hired goats, volunteers, and mechanical equipment. Conservancy interns are also conducting extensive vegetation mapping of *Acacia* throughout the Preserve using Esri's Collector App. Once this baseline data is complete, the Conservancy will develop a strategic plan for additional removals in the entire Preserve.

Saving Special Status Species as a Dual Benefit

The Palos Verdes Nature Preserve is home to four covered species under CDFW's Natural Communities Conservation Planning Program: the California gnatcatcher, coastal cactus wren, El Segundo blue butterfly, and the Palos Verdes blue butterfly. Upon completion of this project, the cleared land will provide an opportunity for habitat restoration and enhancement—with cactus scrub enhancement as a primary consideration. This strategy was proven to be successful in 2018, when the Land Conservancy enhanced mature cactus stands by removing invasive shrubs and planting 15-gallon mature cactus. Land Conservancy community scientist volunteers have reported back with positive results this year.



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PVPLC Conservation interns mapping *Acacia*.



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One-third of an acre of the invasive *Acacia* shrub was removed daily over the course of the four- to six-week project.



When invasive plants like *Acacia* are removed, native plants can develop and thrive to provide improved habitat for local wildlife, including the federally-threatened coastal California gnatcatcher and the cactus wren, a California Species of Special Concern.

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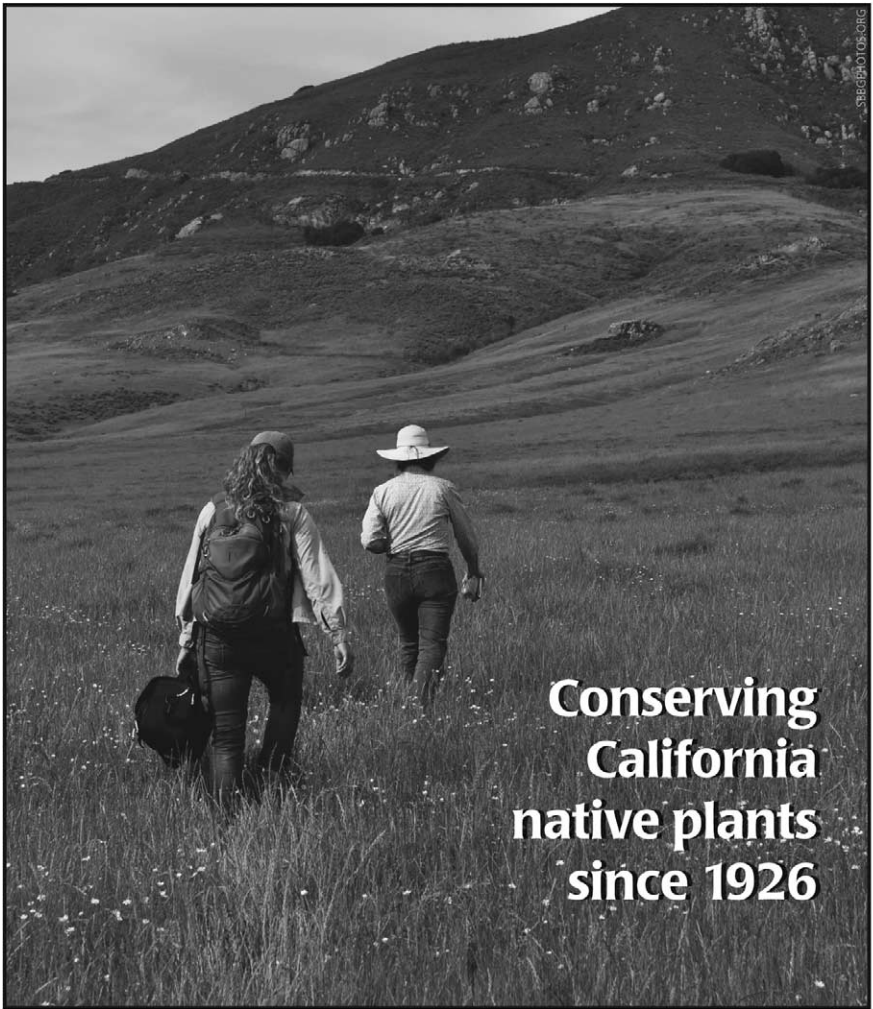
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Photo courtesy Mauricio Gomez

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