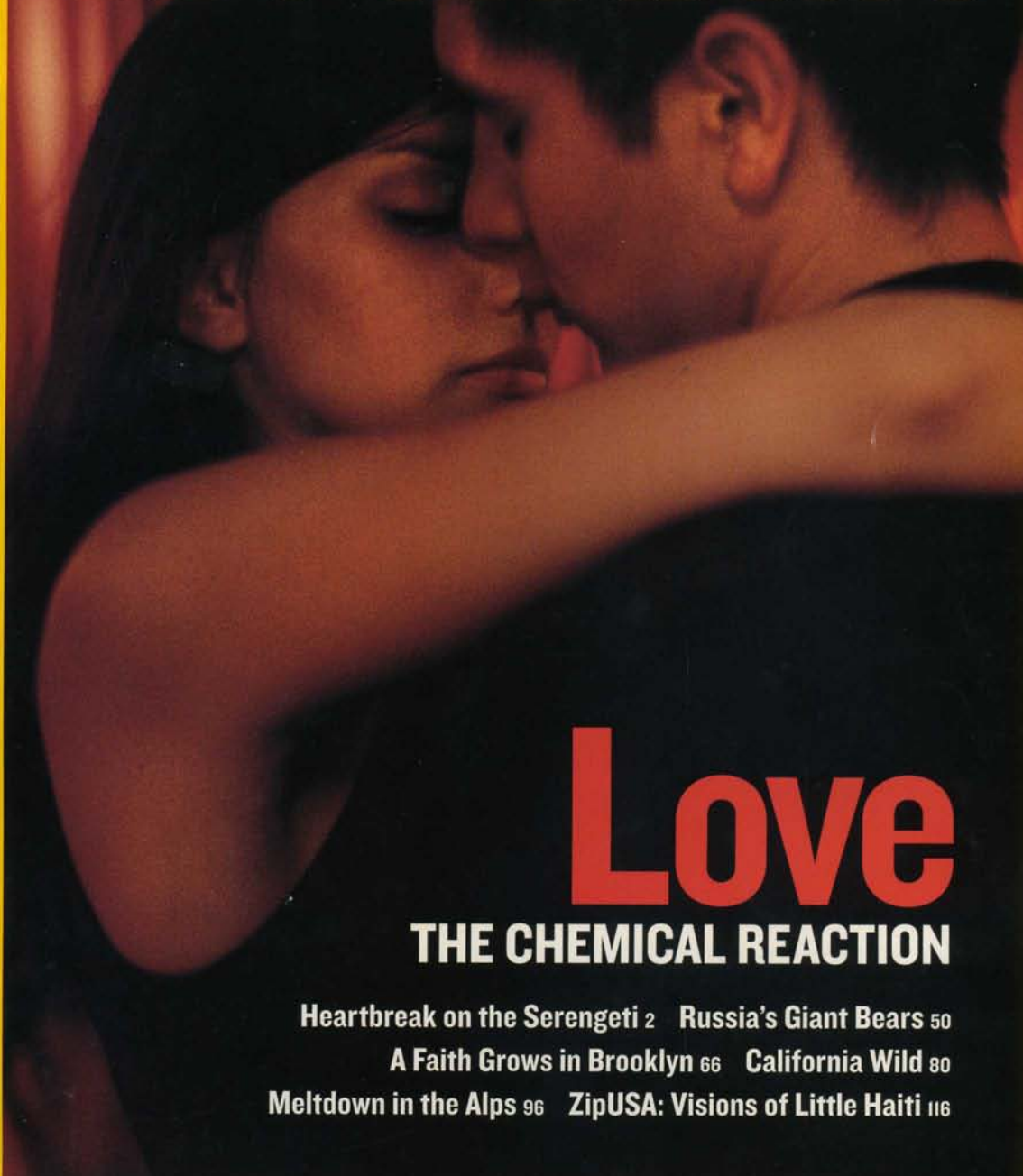


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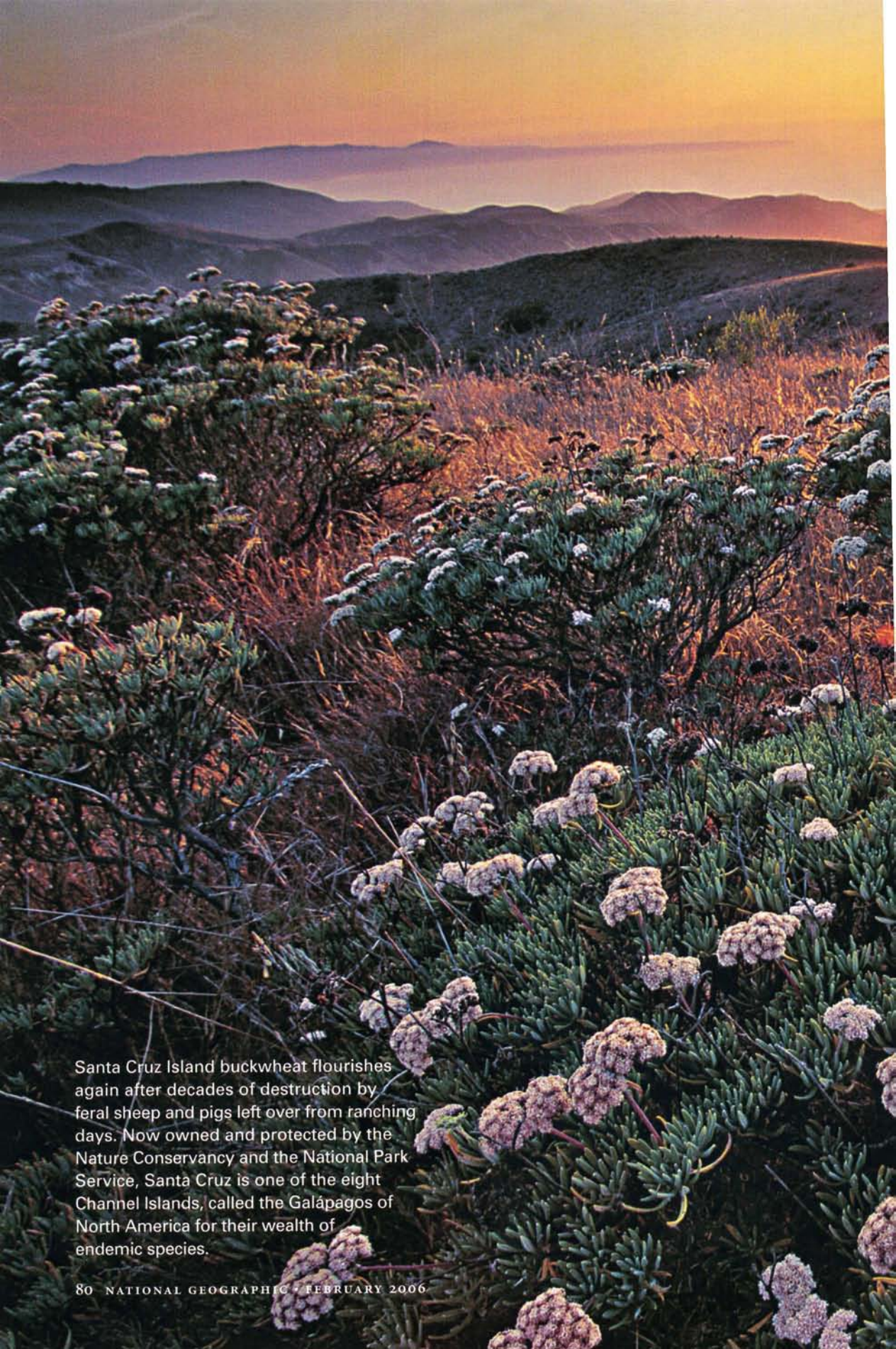
Love

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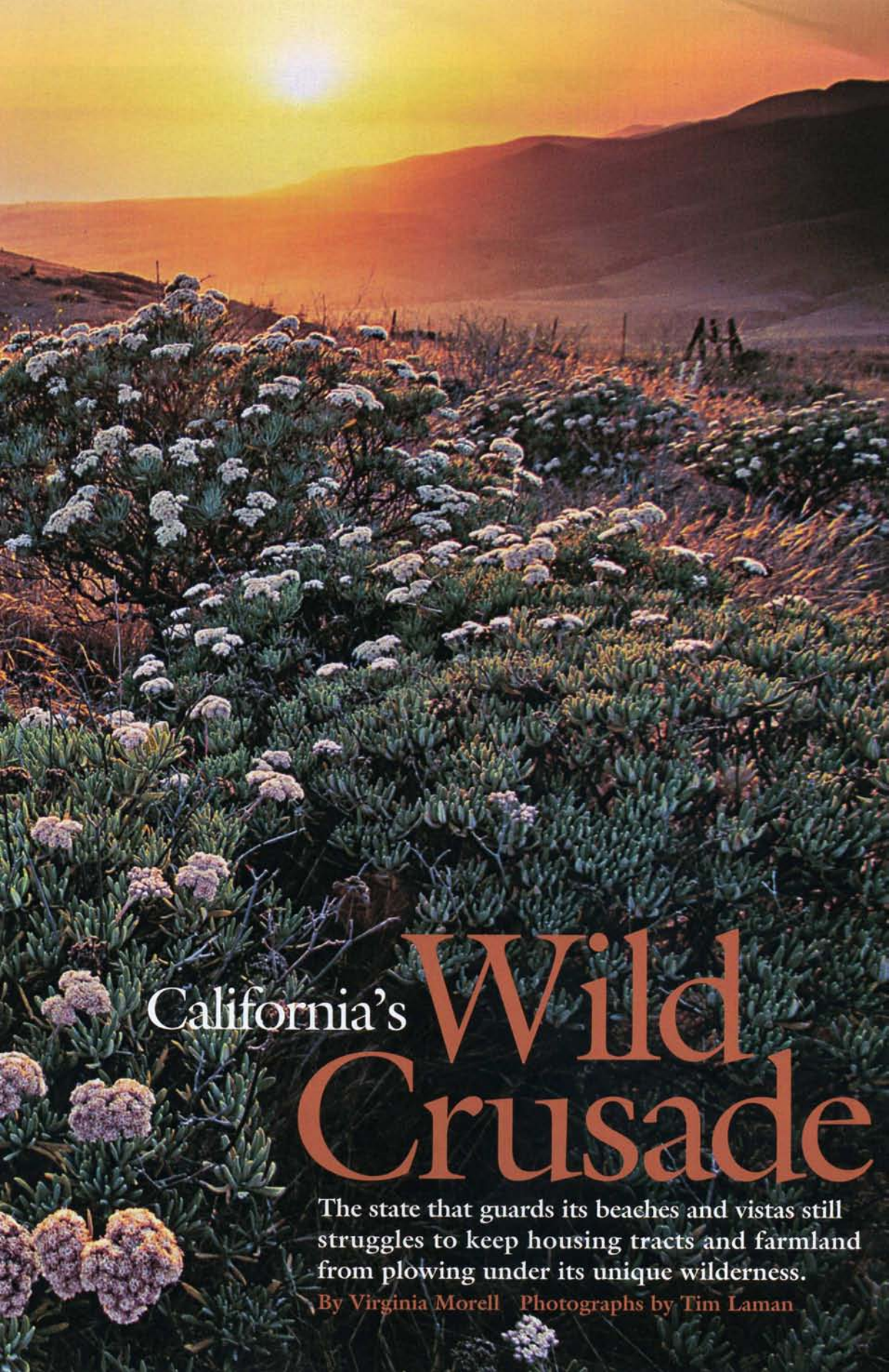
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Santa Cruz Island buckwheat flourishes again after decades of destruction by feral sheep and pigs left over from ranching days. Now owned and protected by the Nature Conservancy and the National Park Service, Santa Cruz is one of the eight Channel Islands, called the Galápagos of North America for their wealth of endemic species.



California's **Wild
Crusade**

The state that guards its beaches and vistas still struggles to keep housing tracts and farmland from plowing under its unique wilderness.

By Virginia Morell Photographs by Tim Laman





Bent but unbroken, an ancient bristlecone pine endures in California's White Mountains. The slow-growing bristlecones, Earth's oldest known living things, can survive for 4,000 years or more and may stand long after their deaths.

Guy Wagner knows the value of a good fence. In the gated communities of Rancho Mirage—where palm trees sway against the blue sky and lawns surround the white-stuccoed houses like emerald-colored pools—he is pleased with what he doesn't see these days. A few years back he routinely found bighorn ewes and lambs munching and frolicking on the manicured parkways. "Sheep have lived here for at least the last 10,000 years," says Wagner, a biologist with the U.S. Fish and Wildlife Service. "So they think they belong here—they do belong here. But people live here now too, and they don't want the sheep on their lawns, eating their roses, falling into their swimming pools and dying."

To keep man and beast apart, the Fish and Wildlife Service helped Rancho Mirage build a high fence on the hillsides to block the animals. The sheep, endangered peninsular bighorns, had been coming down from the desert canyons to feed in the valley. Fewer than 700 remain in California.

The fence works. The sheep have reverted to a natural diet and returned to their former range, which at higher elevations ends at the line of dense vegetation: They simply won't go where they can't see mountain lions and other predators.

Glorious as the sheep are, the true stars of California's wilderness may be its plants—from giant sequoias and coastal redwoods to flowers setting

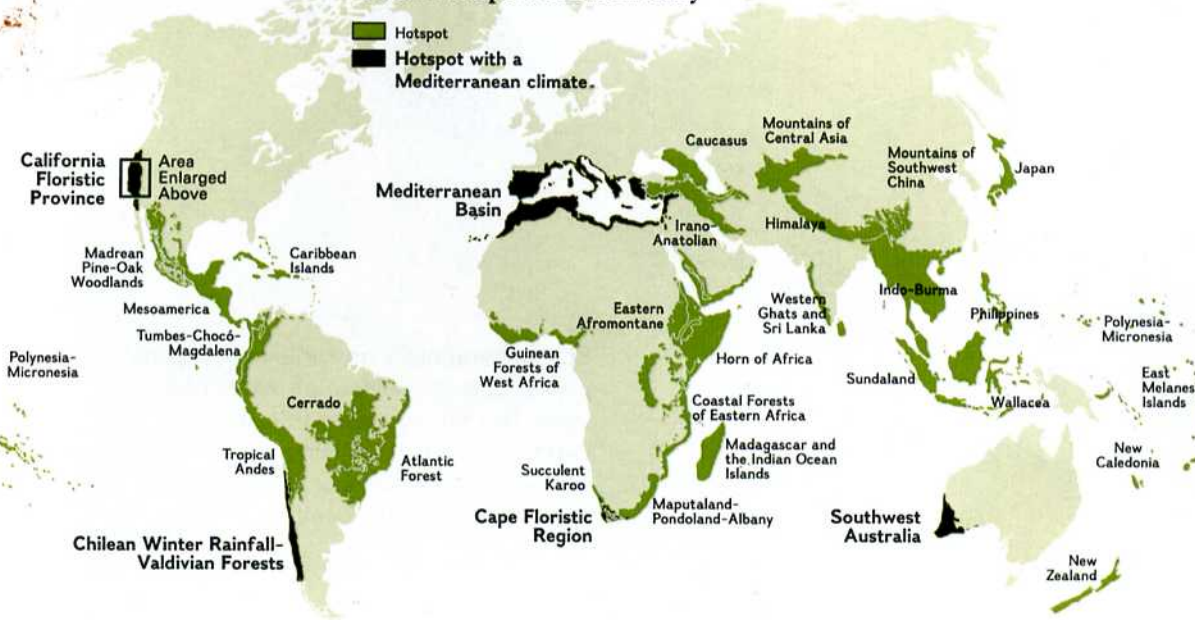
California Hotspot



Worlds at Risk

The forests and wetlands of the California Floristic Province—an ecological zone taking in most of California and bits of Oregon and Mexico—hold flagship species like the California condor and more than 2,100 endemic plant species. Conservation International has labeled the province one of Earth's 34 hotspots of biodiversity (below), one of only five with a Mediterranean climate of hot, dry summers and cool, wet winters. Many of the province's species are threatened by agriculture and sprawl.

Global Hotspots of Biodiversity



SOURCE: CONSERVATION INTERNATIONAL; NGM MAPS

meadows ablaze to tiny, brittle plants growing in the region's infertile soils. Rocks from the Earth's mantle seldom see the sunlight. It's only in places where tectonic plates have collided, like California, that mantle rock—loaded with magnesium, iron, nickel, chromium, cobalt, but low in calcium—has been squeezed to the surface. Water changes the rock to serpentinite, named for its green snakeskin pattern, which, as it weathers, breaks down into nutrient-poor soil, heavy with metals. Such soils would kill most plants.

Yet only in the small scattered pockets of serpentine soils will you find *Streptanthus breweri*, surrounded by rocks glowing in the sun, glassy and metallic. This plant is but a rosette of grayish leaves until the spring, when it sprouts a single stem with tiny purple blossoms, gems that gave it its common name—jewelflower.

S. breweri has other tricks. To defend itself against the caterpillars of a butterfly that lays its eggs on the plant, *S. breweri* has evolved leaves edged with raised orange dots—fake eggs, designed to fool the butterflies into thinking another butterfly got there first.

"That's what California's biodiversity is all about," says ecologist Susan Harrison. "Small things giving rise to other small things." Harrison works with state agencies and local groups to encourage the setting aside of serpentine-rich lands. In public talks she stresses the rarity of these plants and how, because many are new species, they offer scientists a "natural laboratory of evolution"—a way to investigate how biodiversity comes about.

Much of the state is so distinctive, in fact, that scientists dubbed it (with apologies to Oregon and Mexico, which contribute parcels) the California Floristic Province. With a Mediterranean climate, geology as mixed as fruitcake, and isolation behind the Sierra Nevada to the east, the province yields a remarkable floral abundance. Of its 3,488 native plant species, 60 percent can be found nowhere else on Earth. The count of endemic animals pales by comparison: reptiles, 4 species; birds, 8; freshwater fish, 15; mammals, 18; amphibians, 25. But endemic insect species number in the thousands.

The trouble with small things is that they are easy to ignore. If the big things get hammered (96 percent of the old-growth redwood forests have been cut, though most of the remaining stands are protected), what hope is there for the small ones? How do you convince people—especially those living in regions of highly diverse and threatened species—about the importance of saving the shrinking store of life?

In 1989 the Washington, D.C.-based organization Conservation International (CI) turned to the idea of biodiversity hotspots. To earn the label, regions had to support at least 1,500 endemic plant species and to have lost 70 percent of their primary habitat. The bad news: The California Floristic Province made the list in 1990.



A volunteer with the Golden Gate Raptor Observatory prepares to release a red-shouldered hawk banded for a migration study. In California these adaptable hawks thrive in urban parks, golf courses, and cemeteries. Says researcher Buzz Hull, "The species that survive are those willing to live with humans."



"The original list had ten hotspots," says Michael Hoffmann, a biologist with CI. "Now we're up to 34. We've recently recognized that Japan has a diverse flora, and the Ethiopian Highlands also needed to be on the list because of its rare Afromontane habitats and species."

The hotspot approach exerts a strong influence in setting global conservation priorities, focusing public attention and strengthening the resolve of governments. It has helped attract an estimated 750 million dollars to the conservation cause, according to CI.

CI's hotspots often, though not always, overlap with regions selected by other groups for targeted effort, including the 218 Endemic Bird Areas defined by BirdLife International and the Global 200 Ecoregions defined by the World Wildlife Fund. Conservationists are working to increase the overlap and avoid missing important regions, recognizing that the best way to save threatened species is to protect the places where they live.

Identifying irreplaceable habitats and the species they hold is one thing; protecting them is another. On the ground, conservationists run headlong into questions of local politics, economic stability, and human need.

"We haven't focused our efforts on the hotspots in developed countries, although we believe such areas are truly important," says Hoffmann. "We've chosen to work in developing countries. We'd like to think that developed countries would take care of their hotspots themselves."

The California Floristic Province faces grave threats, as do four other hotspots with a Mediterranean climate (hot, dry summers and cool, wet winters)—parts of Chile, Australia, and South Africa, and, not surprisingly, the Mediterranean basin. The reason? "They're all beautiful places with wonderful climates, and people want to live in them," says Rebecca Shaw of the Nature Conservancy in San Francisco. "So all these regions tend to face the same problems: fragmentation of habitats, urbanization, and the expansion of agriculture."

California alone, already the most populous state in the country, expects ten million new residents in the next 25 years. "Planning for growth is truly our biggest problem," says Shaw. "Yet, unlike some other regions, there is high awareness about how important environmental protection is, from the people to the legislature."

California has protected 20 percent of its land—a percentage second only to Alaska. The catch: Most reserves are set aside based on scenic values (in high elevations) and lowest economic impact, not on saving the most biodiversity. In fact, only a tiny percentage of the areas where California's hotspot species live is protected.

Above the lush hedges of Rancho Mirage, bighorn sheep continue to turn back at the sight of the fence. But Guy Wagner knows the fence alone will not save this population of sheep. Housing and golf course developments continue to chip away at the valley floor, as do homes and hiking and riding trails in the mountains. "We're pushing the sheep into a narrow band of habitat," Wagner says, "one that doesn't include enough browse for them on the alluvial fans or escape routes up the slopes. Will they survive? It's going to take some tough choices."

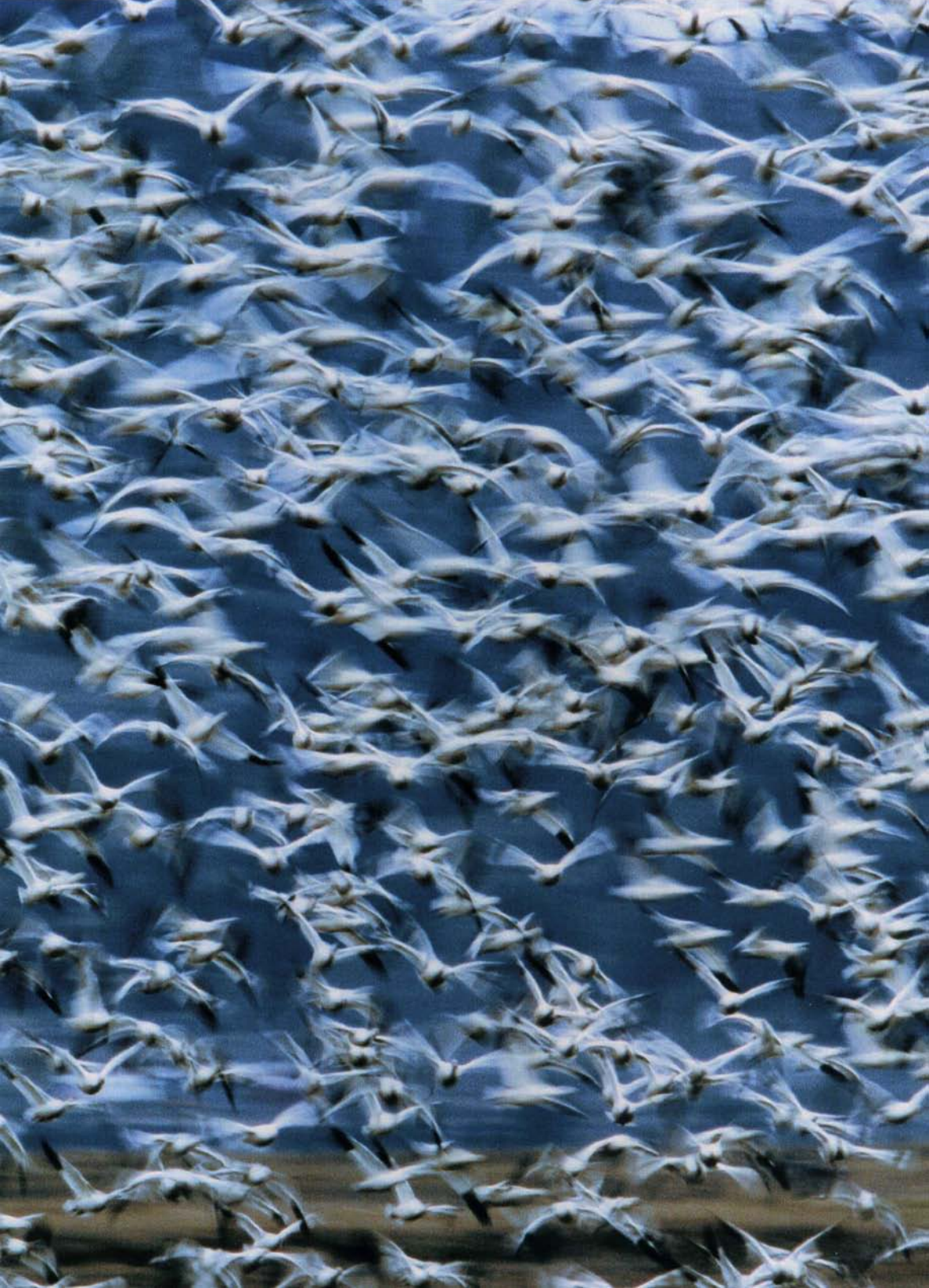
California sea lions doze on Goldfish Point in La Jolla. Protected since 1972, the marine mammals number over 200,000, with the population growing about 6 percent a year. Preying on fish, the sea lions stress the ecosystem and compete with local fisheries, raising questions about their optimal numbers.

Following pages

A blizzard of snow geese and Ross's geese sweeps over the marshes of the Lower Klamath National Wildlife Refuge in northern California. The nation's first waterfowl refuge, this land was set aside in 1908 after much of the region's wetlands had been drained for farmland.

CALIFORNIA DREAMING Download free wallpaper and bring the wonders of California's hotspot to your desktop. Then browse an online-exclusive photo gallery and share your opinion on how to preserve this distinctive region in our forum at ngm.com/0602.







On Santa Cruz Island (above), candleholder live-forevers stick out from a canyon wall, increasing their chances of being pollinated. "Sheep found these succulent plants very tasty, and they declined," says botanist Steve Junak. "Now that the sheep are all gone, the live-forevers have rebounded." It's a different story in California's Prairie Creek Redwoods State Park (right), where botanist Steve Sillett scales a 325-foot giant to check sensors that measure microclimates in the tree's crown. "Old-growth redwoods were so heavily logged by the 1970s that less than five percent of them are left," he says, "and only one percent of the really tall ones."



They may look like snakes poised to strike, but cobra lilies are passive killers. These carnivorous pitcher plants grow in soil called, fittingly enough, serpentine. Inhospitable to most plants, serpentine soil is loaded with metals and lacks nutrients. The cobra lily compensates by luring insects into its reservoir with nectar, then digesting the victims, a vital source of phosphorus and nitrogen.





Winter home to nearly a million waterfowl, the Sacramento National Wildlife Refuge in California's immense Central Valley offers sanctuary along the Pacific flyway between Mexico and Alaska. Yet farms and cities have gobbled up nearly all the valley's wetlands, essential for sustaining diverse animal life. The state's agreeable weather and attractive geography have promoted a seemingly endless influx of people, making habitat protection an increasingly difficult enterprise. □

