

Can California Reverse Biodiversity Decline?

by [Jane Braxton Little](#)

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The trail from Silver Lake rose steeply past Jeffrey pines and granite boulders shimmering in the Sierra Nevada sun. At the top of a knoll Jim Battagin veered off the well-worn path that led to Bucks Lake Wilderness, striding instead through manzanita and huckleberry oak until he reached a moist depression winding along the edge of a rocky outcrop.

Battagin, a consulting botanist, was on a quest for the buttercup-leaf suksdorfia (*Hemieva ranunculifolia*), a small perennial herb considered imperiled in California. It had not been documented since 1975, when Wayne Dakan, a local self-taught botanist, found it for the first time since pioneering naturalist Rebecca Merritt Austin recorded it in 1877 along a ditch built by Gold Rush miners. Battagin followed the wet trickle for nearly a mile, finally stopping beside a lichen-covered boulder jutting out from the wall of rock. “There it is,” he said, beaming, and pointed to a nine-inch plant topped by a flat-topped cluster of white flowers. “Still doing just fine.”

Today volunteer botanists like Battagin are scouring the far reaches of California to catalog and map native plants like suksdorfia. It’s part of an ambitious plan to understand and protect the vast and still-undocumented diversity of the flora and fauna that inhabit this state, one of the world’s 36 [biodiversity hot spots](#). It’s a daunting task—an all-hands-on-deck Manhattan Project–style venture for a state with more native species than any other. Among them are 2,000 plant taxa found nowhere else on earth and more bee diversity than in the Amazon Basin.

It’s now or never for this biodiversity mission. The state has more than 300 endangered species ranging from the desert slender salamander to the California condor. Scientists say two-thirds of the state’s native plants will lose most of their range in the next 100 years. At a time when development is paving over habitat and climate change is transforming ecosystems at an unprecedented pace, California

Secretary for Natural Resources Wade Crowfoot says the state has a moral imperative to focus on biodiversity.

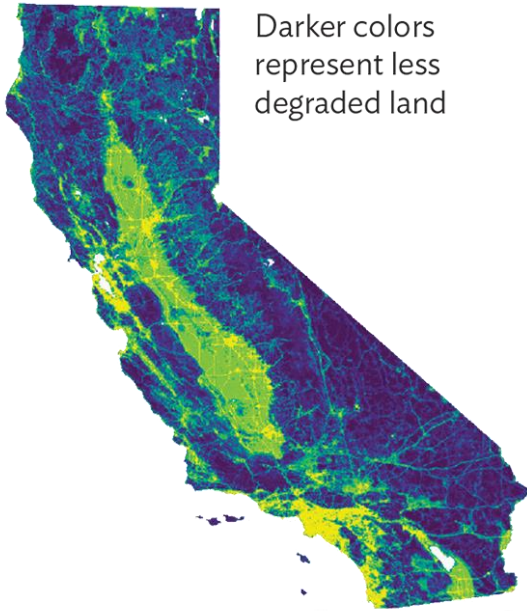
“Given this abundance of nature and the pressure it faces amidst modern society, we need to take new actions to protect California’s one-of-a-kind community of plants and animals,” Crowfoot said in a [blog post in November 2019](#).

University scientists, conservation organizations, and a gaggle of state agencies have responded in a coordinated commitment called the [California Biodiversity Initiative](#). Launched in 2017 with a call to action signed by 26 scientific experts, it was embraced by then-Governor Jerry Brown in a 2018 [executive order](#) and defined in a subsequent “[road map](#)” outlining the need to identify, manage, and monitor all native species, with an emphasis on those that are unique to California. Crowfoot, who has made biodiversity one of his three major priorities, has asked California Department of Fish and Wildlife Director Charlton Bonham and other natural resource agency directors to prioritize protecting California’s one-of-a-kind community of plants and animals.

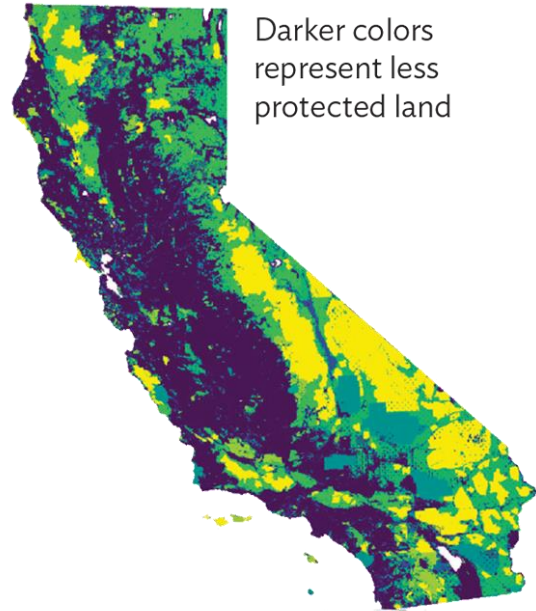
Despite this extraordinary political commitment, the Biodiversity Initiative faces enormous challenges. Rising temperatures are altering the habitats of the giant sequoia and endangered Chinook salmon faster than well-intentioned agencies can protect them. The state is [struggling](#) to meet its own ambitious emission reduction goals. And even with the reductions achieved within California, the world continues to spew greenhouse gases oblivious of the state line. It’s clearly laudable to undertake the effort to identify native biodiversity and strategies to protect it, says Peter Moyle, a University of California, Davis, fish biologist who is not affiliated with the initiative; “it’s just not enough.”

California is better positioned to meet its goals than many other political jurisdictions around the world, says Graham Chisholm, senior policy adviser with the California consulting firm Conservation Strategy Group. Biodiversity programs receive an \$18.6 million allocation in the state’s current budget. Gov. Gavin Newsom’s proposed budget requests \$5.6 billion for natural resources agencies, and a proposed climate bond includes additional resources. If approved, the funding, performance goals, and focused leadership are a starting point for the massive tasks called for in the Biodiversity Initiative, Chisholm notes.

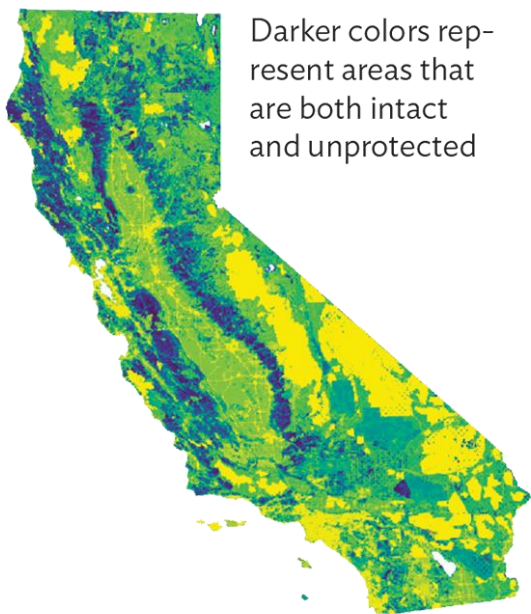
LANDSCAPE INTACTNESS



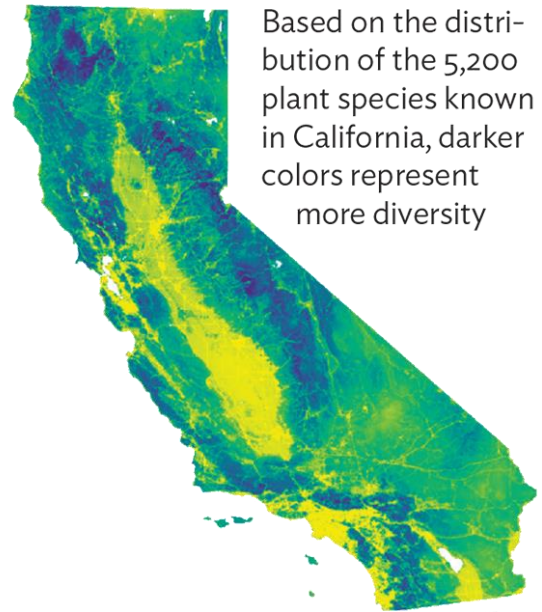
UNPROTECTED STATUS



UNPROTECTED INTACTNESS



SPECIES RICHNESS



A map made by UC Berkeley ecologist Matthew Kling shows four views of biodiversity and protection in California. (Kling Matthew M., Mishler Brent D., Thornhill Andrew H., Baldwin Bruce G. and Ackerly David D. "Facets of phylodiversity: evolutionary diversification, divergence and survival as conservation targets." 374. Phil. Trans. R. Soc. B.)

Newsom has thrown enthusiastic support behind seed-banking as a way of protecting plants. Working with \$3.6 million in state funds, scientists, students, and botanists like Battagin are heading for hills and wetlands, rangelands, and estuaries. Fanning out across the state's 100 million acres, they are collecting seeds from the rarest plants, says Dan Gluesenkamp, executive director of the California Native Plant Society. When the 196 participants in the United Nations Convention on Biodiversity meet in China in October 2020, Gluesenkamp wants California to be one of the parties meeting an ambitious goal of seed-banking 75 percent of its rare plants.

Like other goals of the Biodiversity Initiative, that aim is entwined with a variety of ongoing state programs. Healthy plants require healthy soils, a tenet that drives a state Department of Food and Agriculture [program](#) offering incentives to California growers and ranchers. Healthy soils sequester carbon and reduce greenhouse gases, the focus of state programs that include the [Forest Carbon Plan](#). Climate change and biodiversity loss are parallel stories playing out in our lifetimes, Bonham says: "What does it look like to be climate resilient? What does it look like for people and animals and plants to be able to adapt to that? California is a quiet leader in this space, but has an opportunity to become a predominant voice nationally and internationally."

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Scientists are key participants. University of California researchers are applying genome sequencing technology to conservation to understand the fundamentals of the state's genetic biodiversity. Around \$12 million is funding urgent explorations that include developing a framework to ensure the data collected will use consistent formatting, basically a common language for 21st-century biodiversity conservation, Gluesenkamp says.

While plants have been the focus of early activities, the initiative runs the species gamut, with money devoted to projects such as whale monitoring and modernizing fish hatcheries. The emphasis, however, is on terrestrial ecosystems at the expense of aquatic species, Moyle says. Fish, invertebrates, amphibians, "all kinds of aquatic critters also in decline are pretty much ignored," he notes, and he's called for better use of existing databases to guide planners in mapping areas prioritized for protection.

Tasked with implementing the Biodiversity Initiative, Bonham's department is using a \$2.5 million one-time allocation to update California's [biodiversity atlas](#) and a

2010 [statewide assessment](#) of wildlife corridors identifying which of those are most critical for various species. The department is also mapping the vegetation of the southern Sierra Nevada foothills, where grasslands and oak savannas are critically threatened by development and habitat conversion.

Ultimately, the initiative aims to make biodiversity a lens through which all state agencies approach decision making, whether on surveying for a new highway or planning an elk hunt. That goal is still an aspiration, says Kim Tenggardjaja, Fish and Wildlife's biodiversity coordinator. Working under the constraints of state agencies can be slow going, but the effort is gaining momentum; "anything short of implementing this initiative would be a missed opportunity," she says.

In the process of gathering data to describe an entire state's natural resources, those behind the initiative want to recruit Californians of all types: local botanists like Battagin and people with no degrees in biology who are currently excluded from these activities. Gluesenkamp envisions training cadres of people to do plant surveys, to "flip logs, turn over stones, and find things they never dreamed of... They are the new California. This is the information that future generations will need just to be able to live on this planet," he says.

State agencies are already harnessing community scientists. Armed with smartphones and cameras, around 60 people showed up for a Yolo Bypass bioblitz on September 7, California Biodiversity Day. Using [iNaturalist](#), the nature-observation app run by the California Academy of Sciences and National Geographic Society, they identified crayfish and chicory, bees, bats, and 30 variegated meadowhawk dragonflies—a total of 1,248 observations. And that's just one day at one place. The Academy's [citizen science team](#) has led dozens of bioblitzes across California in the last few years, with nearly 2,000 observers recording nearly 64,000 observations. The same team's Snapshot Cal Coast project has recruited more than 4,000 people to contribute 71,000 observations of California coastal life since 2016, at a time when marine species are on the move and when amateur observations can help scientists document invasions and range shifts.

Biodiversity advocates hope to channel that energy to turn the focus beyond state agencies, scientists, and conservation groups. True success depends on including Californians of all stripes in the shared effort, says Assembly members Ash Kalra (D-San Jose). "It's beyond just a nice thing to do. It is actually essential for our survival," he says. "We fail to respond at our own peril."