

# Inside one man's hunt to rediscover lost animal species

How a long-forgotten jar of a pickled fish launched Richard Lanman's quest to find Santa Clara County's native animals

by [Sue Dremann](#) / Palo Alto Weekly

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When Dr. Richard Lanman purchased his Los Altos home in the 1980s, Adobe Creek, which snaked behind his backyard, was at best a rivulet of trickling water in the summer. In good winters, a rushing torrent carried logs, leaves, silt and debris out to San Francisco Bay.

But his neighborhood's old-timers remembered Adobe Creek as a year-round fly-fishing paradise until the 1950s. His 80-year-old neighbor Herb Bickell told Lanman in 1987 that he'd caught fish from his backyard.

"So too, did Sen. Alan Cranston, who lived just a little bit upstream from us," Lanman said.

But now Adobe Creek is dry for half the year, and there are no fish. Bickell wondered why the creek had undergone such a drastic change.

"Maybe there were beavers," said Lanman, a Los Altos-based physician scientist, historical ecologist and president of the Institute of Historical Ecology. "One of my theories is there were beaver ponds or percolation ponds that raised the water table so that in our dry season, when the water table is high enough, it recharges the creek."

Lanman's urge to answer that question became an additional career in ecological history, leading to research into the Midpeninsula's and south San Francisco Bay's missing links. Now he and his colleagues have published groundbreaking findings confirming the past existence of local populations of Chinook salmon, American beavers and Tule elk.

They've also suggested possible ways to bring the species back.

Little is understood about California's historical ecology prior to the arrival of the Europeans, whose actions wiped out animal populations, he said.

"A lot of the species are already gone by the time the U.S. takes California from Mexico, who had just taken over from Spain," Lanman said.

Zoological records from the time were also not plentiful.

"There's no museums in California except for two in the late 19th century: Stanford Museum of Natural History and the California Academy of Sciences in San Francisco," he said. "And in 1906 — boom — they lose almost everything. The California Academy of Sciences burns to the ground in the 1906 earthquake and fire, and the Stanford Museum of Natural History collapses. But some of the zoology collection survived."

Stanford never rebuilt its museum, but the Academy of Sciences was rebuilt in 1908. Stanford's remaining zoological and botanical collections were given to the Academy, where they remain today.

In fact, it was at the Academy of Sciences that Lanman made a stunning discovery. He wanted to know whether central California coast steelhead trout, a threatened species now protected by law, had inhabited Adobe Creek. The Santa Clara Valley Water District had told Lanman that steelhead never lived there, he said.

"But then I found them in a jar in the California Academy of Sciences," Lanman said.

The three jarred steelhead were collected from Adobe Creek by Stanford University ichthyologist Wilbur Wilson Thoburn in the 1890s. Stanford's first president, David Starr Jordan, was an ichthyologist — fish expert — and had hired multiple ichthyologists among his first faculty, including Thoburn, Lanman said.

"That was the first physical proof of steelhead in our creek. I couldn't find it at first because Adobe Creek was still listed by the old name, which was San Antonio Creek," and the steelhead specimens were also labeled under an older scientific name, he said.

## Revelations about local Chinook

The pickled fish specimens eventually led to further research using DNA of fish vertebrae to turn scientific dogma about another animal species on its head.

Lanman, a member of the Guadalupe-Coyote Resource Conservation District board of directors, worked with Linda Hylkema, director of cultural resources management at Santa Clara University, and other researchers to analyze the DNA of 17,288 fish specimens excavated from Native American middens.

The middens were located at the site of a former rancheria site associated with Mission Santa Clara de Asis dating between 1781 and 1834. The researchers found 88 examples of salmon vertebrae, three of which were from separate individuals identified as Chinook salmon. The remaining salmon specimens were steelhead/rainbow trout.

The findings were "the first physical evidence of the nativity of salmon to the Guadalupe River in San Jose, extending their documented



Dr. Rick Lanman stands in Adobe Creek in Palo Alto on March 31, 2023. Photo by Magali Gauthier.

historic range to include San Francisco Bay's southernmost tributary watershed," wrote Lanman about their research, "Ancient DNA analysis of archaeological specimens extends Chinook salmon's known historic range to San Francisco Bay's tributaries and southernmost watershed," which was [published](#) in the open-access PLOS One on April 15, 2021.

North American Chinook currently range from Point Hope, Alaska, to the Sacramento and San Joaquin rivers in California's Central Valley, which is thought to be its southernmost range. Historical range maps for the Central Valley fall-run Chinook completely excludes San Francisco Bay's coastal watersheds, Lanman said. Government agencies didn't consider San Francisco Bay tributary streams and rivers to be native habitats for Chinook's spawning and rearing.

While Chinook do currently spawn in some Bay Area streams and rivers, government agencies consider the current populations to be hatchery strays, he noted.

Lanman and his colleagues say the fish excavated at the Mission Santa Clara de Asis site — just 3 to 6 miles upstream of San Francisco Bay — would not have been from hatcheries, since the first salmon hatcheries were not established in California until 1874. The salmon were also unlikely to have been traded due to their large size and the historical and cultural practices of the time, they said.

Other documents speak to the historical existence of local Chinook.

"There's lots of old-timer records of Chinook salmon. The first caretaker of Searsville Dam — so we're talking 1890s — the first three years, he sent his son down to the dam with a pitchfork," Lanman said. He used to pitchfork the salmon as they threw themselves just before the Christmas holiday at the base of the dam," he said.

But after three years the salmon couldn't reproduce because the fish couldn't mount the dam, he said.

### Hunting for beavers

Another species that has intrigued Lanman are beavers.

Scientists traditionally dismissed the beaver as a nonnative to the Bay Area, he said. This stance was largely influenced by the 1937 book "Fur-bearing Mammals of California," written by Joseph Grinnell. Grinnell was the University of California, Berkeley's first director of its Museum of Vertebrate Zoology and one of the most well-known figures in American natural history in the early half of the 20th century. Grinnell maintained beavers never lived in the Coast Range and Sierra Nevada watersheds, Lanman said.

"And then I met an archaeologist who found a buried beaver dam in the Sierra Nevada. And that was my first historical ecology publication in 2012. It was a buried beaver dam about 12 feet down, and (we) radiocarbon dated the sticks and it showed this dam had been there for hundreds of years and was rebuilt probably by successive generations of beavers," Lanman said.

"But it ends around 1850 by radiocarbon dating. Of course, 1850 is the gold rush right? And that's when all these Anglo Americans hunted everything out," he said.

By the time Grinnell wrote his book in 1937, the beavers were gone.

"He's suffering from what we call 'shifting baseline syndrome,' where you think the way things look when you were born is the way things always were," Lanman said.

Lanman searched literature, historical accounts and archaeological evidence for the beaver's historical presence in local waterways. He didn't find any beaver specimens in early California museum records.

"But if you look in the Smithsonian, it turns out there's a beaver skull collected on Saratoga Creek around 1855. So that was the first physical evidence of beaver in the Bay Area in a tributary of the south bay," he said.

Lanman and colleagues published the findings in the [fall 2013 California Fish and Game journal](#). They studied museum specimens, zooarchaeology specimens, place names, documents and words for "beaver" in local California Native languages for evidence of beavers throughout western California from the California-Oregon border to San Diego and to the southern Sierra Nevada.

The researchers found evidence all over the state. In the Bay Area alone, they found 24 records from Healdsburg to Saratoga and from Bodega Bay to Fremont. These included a zooarchaeological specimen from the Emeryville Shellmound, which included a 1,500- to 1,700-year-old beaver tooth, a more than 2,000-year-old beaver incisor, dating between 700 and 2,600 years old.

Historical literature also abounds with references to beaver hunts and acquisitions from Native Americans. A 1776 account of the second De Anza Expedition noted that Native Californians wore capes of beaver pelts and pelican feathers.

The famed frontiersman Kit Carson held rights in the 1840s to trap them in the east bay. In Santa Clara County, a 1962 study found historical evidence of beavers "in small numbers at least" in Coyote Creek in Santa Clara County among other places, Lanman and his colleagues noted.

How those beavers might have traveled around the bay and up tributaries in Santa Clara County and perhaps San Mateo County is beginning to be understood due to the presence and growing population of reintroduced beavers.

The semi-aquatic rodents were introduced in the early 1980s to upper Los Gatos Creek near Lexington Reservoir and have been slowly making their way northward. The beavers have expanded their territory by swimming up San Francisco Bay to Coyote Creek to the east; the San Tomas Aquino Creek where it reaches the Sunnyvale Water Pollution Control Ponds; Moffett Gate; and Charleston Slough, just east of the Adobe Creek levee, according to Lanman.

Nine years after the beavers research was published, Palo Alto resident Bill Leikam, co-founder and board president of the Urban Wildlife Research Project and native gray-fox expert, documented the first modern evidence of beavers in a remote section of Palo





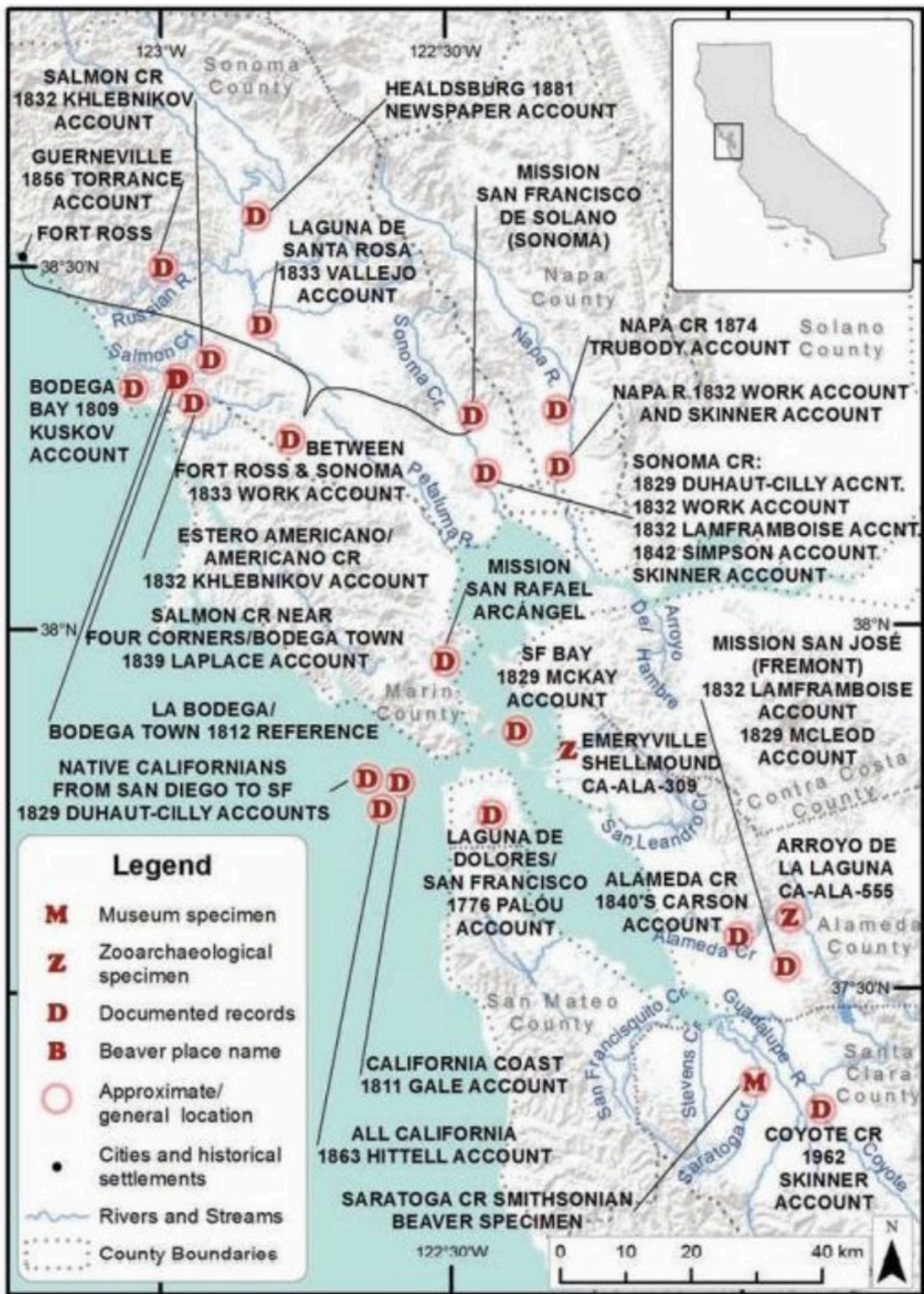
Chinook salmon. Courtesy Getty Images.





A beaver swims in a creek in Palo Alto on Sept. 16, 2022. Courtesy Bill Leikam.





Source: "The historical range of beaver (*Castor canadensis*) in coastal California: an updated review of the evidence," *Journal of California Fish and Game*, Fall 2013. Courtesy Institute for Historical Ecology.



## **Could Tule elk roam the Peninsula?**



Tule elk. Courtesy Getty Images.

Alto's Matadero Creek, where he found two beavers in April 2022. If they are a compatible pair, they could begin colonizing the creek and perhaps slowly lead to a population that would move on to other local creeks, Lanman and Leikam [said in November](#).

Lanman is eager to see how beavers might help revive locally collapsing fish populations. Flood control efforts have altered natural channels, such as San Francisquito Creek, which is dammed by Searsville, the Guadalupe River in San Jose and Palo Alto's Adobe Creek. Lanman wondered how changes to those habitats have affected fish species such as Chinook and steelhead — and whether nature could reverse the damage.

"Beavers are the one thing we haven't tried. They have these important ecosystem benefits, not just for our trout and salmon, but for all kinds of critters: red-legged frogs that are federally endangered; birds that are federally endangered that depend on the hunt over water and bats that hunt over water," he said during a November interview.

### Could Tule elk roam the Peninsula?

Lanman's latest research has explored how reintroduced herds of Tule elk from populations near Mt. Hamilton might be given safe passage to the western side of Santa Clara County.

Unlike the Chinook salmon and beavers, there is abundant archaeological evidence of elk's historical presence in Santa Clara County. Elk remains were identified at California native archaeological sites along San Francisquito Creek in Santa Clara County and at a burial site on the Guadalupe River west of U.S. Highway 101. Early accounts also noted that in some fertile valleys such as Napa and Santa Clara there were elk literally by the thousand, he noted.

Like beavers, elk have been shown to improve ecosystems by reducing grassland and shrubland fire fuels and diminishing the intensity of future fires. A 2019 study of the Tule elk at Point Reyes National Seashore found the population significantly reduces the abundance of a highly invasive grass, *Holcus lanatus*. Elk also help disperse seeds and restore native blue oak and valley oak savanna and woodland habitats.

The animals are also a favored prey for predators such as mountain lions, gray wolves and coyotes, Lanman said.

The biggest impediment to their current migration is Highway 101, which biologists say the majestic ungulates avoid. There is some evidence they could use undercrossings, however, and Lanman thinks that — if constructed properly as to height, width and length — the elk might begin to expand their territory up the Peninsula.

From 1978 to 1981, land managers moved a herd of 65 elk to the Mt. Hamilton area of eastern Santa Clara County in the Diablo Range. They have now rapidly dispersed to five to six herds into southern Alameda County, northern San Benito County and western Merced and Stanislaus counties.

Lanman and colleagues including Muewka and Amah Mutsun native administrations, Leikam, the San Jose State University Department of Anthropology and others advocated in a [2022 paper](#) for the restoration of elk along the Peninsula and coast.

They argued for either relocating a population west of 101 or creating undercrossings in Coyote Valley, the narrowest gap between the Diablo Range and the Santa Cruz Mountains, to enable the elk to recolonize open space habitats in San Mateo, western Santa Clara, Santa Cruz and northern Monterey counties.

Contiguous protected open space in Santa Clara County west of 101 and excluding the Baylands totals more than 97,193 acres — 63,000 acres of which are held by the Midpeninsula Regional Open Space District and 9,750 acres of which are part of the Santa Clara Valley Open Space Authority's holdings.

### Helping elk to survive

The westward expansion into the Santa Cruz Mountains and foothills might also help the elk populations survive drier and hotter climate change, which in their current locations might result in less vegetation to forage.

In studies of different elk habitats, there was a striking pattern that the closer elk get to the coast, the less land a herd needs, Lanman said.

More coastal herds only need 500 acres. In comparison, in Owens Valley, on the east side of the Sierras, they need 20,000 acres.

"It's just a steady decrease as you get closer to the coast," he said.

San Mateo, Santa Clara, Monterey and Santa Cruz counties also have large reservoirs and protected land that would be important water sources and refuges for the elk, Lanman noted.

Lanman and his colleagues think they have hit on a landmark discovery for how to encourage elk expansion to and up the Peninsula.

Lanman and co-researchers from the California Department of Fish and Wildlife and universities examined 10 undercrossings that three subspecies of elk — Tule, Roosevelt and Rocky Mountain — have used from Humboldt County to Monterey County. And they identified the parameters preferred by Tule elk who successfully crossed under 101 in two different places in Morgan Hill and Gilroy.

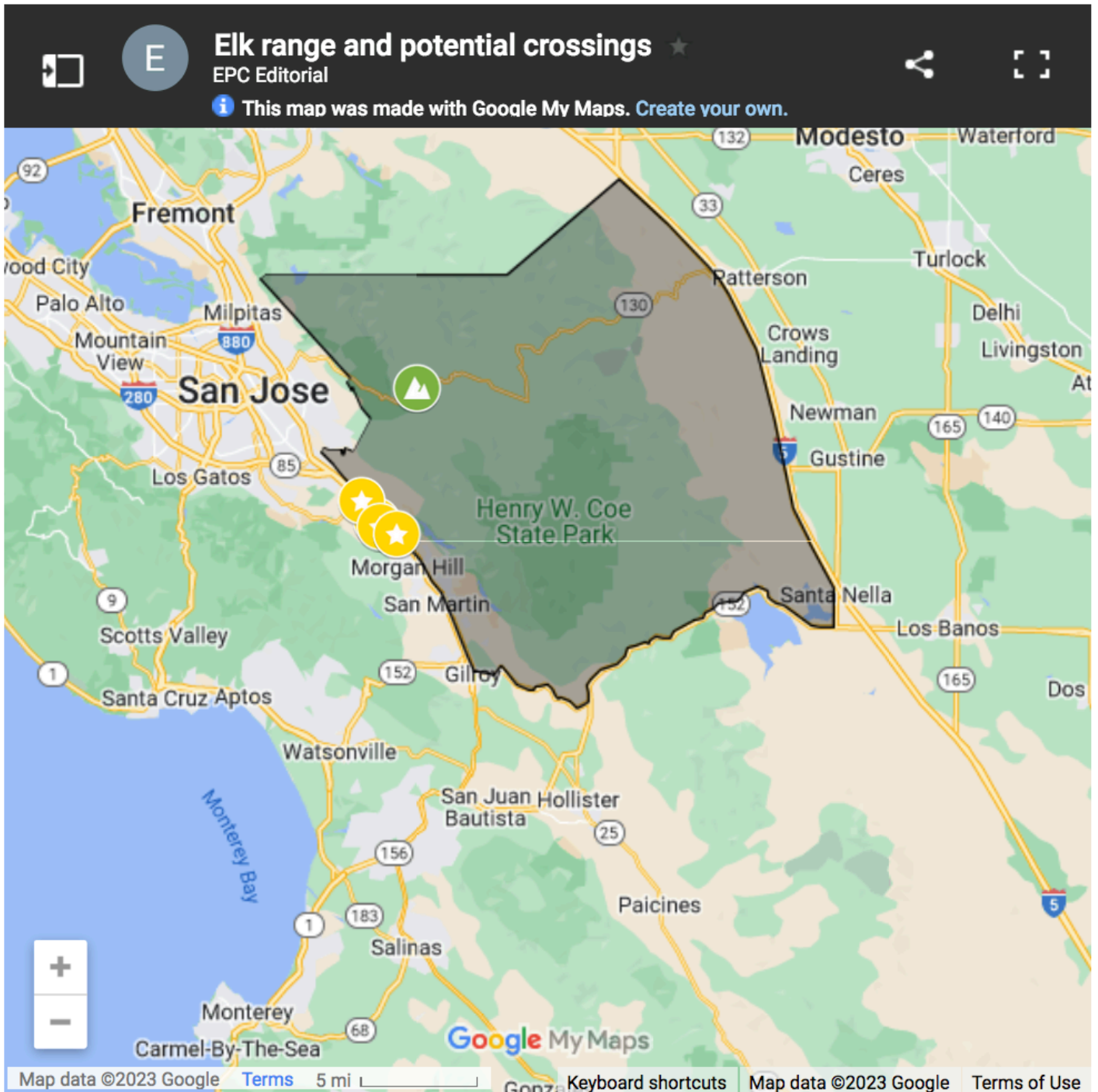
The two-year study could pave the way for creating future connections to the Santa Cruz Mountains under the highway.

"This flipped conventional thinking that elk only like to cross over and not under roads," Lanman said.

Passages for elk and other species are also crucial to wildlife survival. Living in "islands," they lose the genetic diversity that helps maintain healthy populations, becoming overcrowded and weakened by disease and lack of food.

Leikam documented just such a tragedy. In 2017, the fox expert recorded the deaths of all 26 gray foxes in the Palo Alto Baylands, [which succumbed to canine distemper](#). If they'd had more connections, perhaps the healthy ones would have escaped, he said at the





The shaded area roughly shows the existing elk range in Santa Clara County. The stars indicate four possible elk crossings near U.S. Highway 101 that could allow elk to move up the Peninsula. Map by Jamey Padojino.

## Helping elk to survive



Open spaces such as this view of at the Monte Bello Preserve could become fertile habitat for Tule elk if they are encouraged to colonize the western part of Santa Clara and San Mateo counties. Embarcadero Media file photo by Veronica Weber.





Dr. Rick Lanman is photographed above Adobe Creek in Palo Alto on March 31, 2023. Photo by Magali Gauthier.

time.

But understanding that they even existed — and thrived here in the past — is a crucial step to making an ecosystem whole again.

Beaver dams, for example, have been shown to improve stream and creek habitats by reducing silt, creating refuges for fish and "insect cafeterias" for salmon fry. Studies have shown the presence of beaver dams increases young salmon survival 200-fold, Lanman said.

The carcasses of elk killed by larger predators might be of value to scavengers such as California condors, which researchers and land managers have been reintroducing and trying to repopulate for decades. The majestic birds still rely on feeding stations to supplement their diet, he noted.

Returning those animals can also have great benefits for people too, expanding revenue, aesthetic and ecotourism. Elk at Oregon's Jewell Meadows Wildlife Area, which receive supplemental food at winter feeding stations, bring in \$6.5 million annually from winter ecotourism, Lanman said. The wildlife offers fishing, insect control and — in a climate-changing world — protection from earth-scorching wildfires.

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