

UC SANTA BARBARA

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[Harrison Tasoff](#)

From Beyond the Brink

It's a blustery day in October when Wayne Chapman and his team meet at UC Santa Barbara's North Campus Open Space. The group is on a mission: They are introducing into the newly restored wetland 10 herbaceous plants they have been cultivating from seed since the beginning of the year.

As they brave the wind, the restoration staff — all members of the campus's Cheadle Center for Biodiversity and Ecological Restoration (CCBER) — dig holes in the loamy soil and listen to Chapman explain how mulefat, another species they planted earlier, will draw water up toward the surface, helping the new plants establish and thrive.

The group has a tricky task ahead of them. "We don't have a pristine reference site or population to say, 'ah, this is where the plants really love to be,'" said [Chapman](#), who helps manage the North Parcel restoration site — formerly a golf course — and the CCBER nursery facility.

"We're just trying to look at our habitats, our hydrology, our soils and see if there's a sweet spot where they might thrive," he added.

These plants are different from the many others the team studies and works with on a regular basis. This species was extinct for 30 years.

Development and decline

First described by scientists in 1929, Ventura marsh milk-vetch is a short-lived perennial in the pea family. Fairly non-descript, it can grow up to six feet tall over the course of its three to five-year lifespan. Early records of the plant are sparse, with no reference to it being used by the Chumash, the Native American people who historically inhabited the area, according to Chapman. The plant may have medicinal value, he said, as a few of its relatives are used in traditional Chinese medicine. However, Ventura marsh milk-vetch has never been analyzed for it.



Ventura marsh milk-vetch in bloom.

Photo Credit: CALIFORNIA NATIVE PLANT SOCIETY

The plant inhabits the transitional areas where marshes meet upland ecosystems, and its range once stretched from Huntington Beach in Orange county north to the Ventura coast. Over time, however, coastal streams have been culverted and marshes drained or filled, freezing the dynamism characteristic of these ecosystems. The creek-side and seaside areas favored by the vetch have been developed into prime real-estate and shored up against shifting sands and wandering banks. And as its habitat gradually disappeared, so too did the marsh milk-vetch.

“There just doesn’t seem to be any of those places for them anymore,” Chapman remarked.

Efforts were made to protect the vanishing species, but they didn’t prevent its disappearance. Ironically, the last known Ventura marsh milk-vetch were inadvertently mowed by maintenance staff at McGrath State Beach in 1967. A staff member of the Ventura County Agricultural Commissioner’s Office found the mulched plants near the entrance shortly thereafter. The plant had gone extinct.

An astonishing reemergence

In June 1997, wildlife biologists Kate Symonds, of U.S. Fish and Wildlife Services, and Morgan Wehtje, then at the California Department of Fish and Wildlife, were surveying a proposed development site near Mandalay Beach in Oxnard. The property was formerly used for disposing of oil field waste, and the land was being considered for remediation.

The two biologists happened upon an unusual milk-vetch growing on the secondary dunes and sent samples to the U.S. Fish and Wildlife Service for identification. To everyone's surprise, the plants were Ventura marsh milk-vetch, growing just a bit south of McGrath, where the last known individuals had been cut down 30 years earlier.

Scientists were left scratching their heads as to how the plant could have resurrected itself.

Consulting botanist Mary Carroll spearheaded early conservation work on the rediscovered marsh milk-vetch. The first task was to collect seeds that could then be used to propagate plants in nurseries and build a stockpile for use later on.

Researchers at UC Santa Barbara got involved shortly after the plant's rediscovery. "My predecessor, Wayne Ferren, did some initial research with the species back in 1998 here at the herbarium," said [Lisa Stratton](#), CCBER's director of ecosystem management. Ferren was involved in the initial assessment of the Oxnard site and the first efforts to establish new research populations.

Efforts to resuscitate the species received a boost in 2001, when the federal government listed the Ventura marsh milk-vetch as an endangered species. The listing significantly increased the resources and protections that could be committed to the plant's conservation.



Dozens of Ventura marsh milk-vetch await planting in the CCBER nursery.

Photo Credit: HARRISON TASOFF

Some of the first new populations of Ventura marsh milk-vetch were established in 2002, not long after the listing, in an effort to expand the species' range beyond the single site in Oxnard. Plants were introduced to the Carpinteria Salt Marsh and Coal Oil Point natural reserves, which are managed by UC Santa Barbara. These sites are north of the species' historic range, but in light of ongoing climate change, assisted migration is probably a good idea, Stratton explained.

As conditions warm, conservationists are moving species upward — either up north or up slope — to areas with conditions that match the species’ historic preferences. “It’s a normal thing to do in the era of warming climate,” Chapman added.

Filling in the blanks

Stratton and Chapman have their work cut out for them.

“No one learned the plant’s biology or habitat before it disappeared,” Chapman explained. “We don’t even know what their ideal habitat is.”

The team must piece together basic information about the plant — such as what soil it prefers, where it grows and how it fits in with other local flora. No one even knows what animals pollinate Ventura marsh milk-vetch.

Some of this information can be gleaned from studying the milk-vetch’s biology and taxonomy, but a great deal will come down to experimentation. “Part of our goal in growing these is simply to plant them in an experimental framework and see where they do best,” Stratton said.

“Important here is hydrology,” Chapman added. “It likes very moist soil year-round, but not flooded, which is hard to come by in a Mediterranean climate with dry summers.”



The Devereux slough meanders through the North Campus Open Space and Coal Oil Point Reserve much as it would have before the region was developed. Restoration staff hope the Ventura marsh milk-vetch will take to the area.

Photo Credit: OWEN DUNCAN/ SANTA YNEZ VALLEY NATURAL HISTORY SOCIETY

Researchers suspect that Ventura marsh milk-vetch used to grow in back dune habitat, coastal meadows, salt marshes and along the ever-changing banks of Southern California's coastal streams. The region used to have lots of free-flowing creeks that would meander through dune systems on their way to the ocean. But this habitat is now exceedingly rare.

Throughout the 20th century upstream water has been diverted to meet the needs of the region's expanding population. Coastal development has constrained streams, and many have had their banks either shored up or completely culverted. Dune ecosystems have fallen victim to many of these same pressures.

Extinct or extant?

So, how did the species return from the other side?

Stratton, Chapman and their colleagues believe that dormant seeds may have hitched a ride in soil trucked in to cap the oil disposal site. Legumes like the marsh milk-vetch have extremely hardy seeds that can remain viable for decades.

Alternatively, the seeds could have already been present at the site, simply biding their time until conditions were more favorable. Ultimately, no one knows exactly where they came from.

The saga of the Ventura marsh milk-vetch raises a perplexing question: When is a species considered extinct?

Regardless of any seeds lying dormant in the soil, there were no living plants for three decades.

"I feel like there needs to be living individuals for a species to be considered extant," Stratton said, "because otherwise you don't really know if you have the conditions to support the seeds that you have, if you even have seeds. For all intents and purposes, it's extinct."

That said, thousands of plant species meet these conditions every year. "Annual plants do this, they all die annually and then reappear," Chapman said, "and that's expected because they're reliably going to come back."

But, while annuals always go through this lifecycle, Ventura marsh milk-vetch is perennial. With a plant as rare as the marsh milk-vetch was, with such poorly understood ecology, it's not unreasonable to worry that it's gone extinct when the population falls to zero, he added

However, annuals are not the only plants that disappear for periods of time. This is even more true of species that return after disturbances like wildfires or landslides, as well as those that go into stasis for long periods of time, like some desert plants. Scientists believe this may be the case for the Ventura marsh milk-vetch.

A promising new year

By year's end, conditions were calm at the North Campus Open Space. The winds had died down and the mild California winter had set in bringing rain and cooler weather, perfect conditions for the young marsh milk-vetch to acclimate to their new home.

Thanks to the team's efforts, 219 new plants had joined the 10 pioneering individuals since October. "Most seem to be spreading roots, pushing out new growth and doing well," said Chapman.

"In an increasingly changing world with an ever-growing population, the fate of rare species and habitats does seem uncertain," he continued. "However, every achievement made — whether it is the restoration of a golf course back into a coastal estuary or the lifeline introduction of an endangered plant — makes their future seem that much more hopeful."

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.