

Bringing a Butterfly Back From the Brink

by Susan Morse

As refuges go, it's not much to look at: a sandy patch of scrub land in urban central California, wedged between a row of industrial complexes and the San Joaquin River. But unassuming Antioch Dunes National Wildlife Refuge is the world's last holdout of a finicky species: the Lange's metalmark butterfly (*Apodemia mormo langei*).

Whether the species will survive is not yet clear. But human intervention may, at long last, be improving its odds.

Metalmark butterflies – fragile and brightly colored – are named for their grey, or metallic-tinged, wing tips. Unlike many other butterflies that can produce several generations of offspring each year, the Lange's metalmark breeds only once annually. For reasons that are not well understood, it sticks close to home. It's also a fussy customer. It will take nectar from various plant species, but for its host plant it prefers a single variety of buckwheat – naked stem buckwheat (*Eriogonum nudum* ssp. *auriculatum*) – found on the refuge.

Such habits have helped put the butterfly in a precarious spot.

Steady declines in the metalmark's numbers led to its federal listing in 1976, when it was one of the first insects to be protected under the Endangered Species Act. But the species seemed headed for extinction when, in 2006, the total population dropped to 158, down from 5,976 in 1997.

Even more alarming was the peak count – a key measure butterfly experts, or lepidopterists, use to assess and compare the reproductive health of a species from year to year. Once a week in August through September, they count the number of butterflies that emerge as adults from the chrysalis, the enclosure in which the caterpillar transforms into an adult butterfly. The number of butterflies counted builds weekly and then crests and falls, forming a bell curve. The peak count is the highest of the weekly emergence counts.

A Lange's metalmark butterfly perches on naked stem buckwheat, its preferred host plant.



Louis Terrazas/FWS

In 2006, the peak count was just 45. Fish and Wildlife Service staff decided there was no more time to lose.

Biologists to the Rescue

During the next year's breeding season, biologists captured nine egg-bearing females and placed them in two breeding facilities – one at Moorpark College, the other at University of California-Riverside. In August 2008 scientists released 30 adults, 25 larvae, and five pupae (cocoons) produced from that initial stock onto the refuge. It marked the first successful breed-and-release program for this species.

The next test will be the 2009 peak count. Even apart from the captive breeding effort, there's reason for hope. The 2007 peak count was 89, and it grew to 132 in 2008.

Why the fuss over one species most of us will never see? The metalmark's predicament is "a snapshot of the health of a particular habitat or community," says refuge wildlife biologist Susan Euing. The loss of such a key pollinator species could set off a chain reaction leading to the decline of other species within that community. "Pollinators like butterflies, bees, bats, and birds are incredibly important for any given habitat to succeed," she adds.

So, while the refuge awaits this year's peak butterfly count, refuge biologists are working on another front, trying to give the butterfly's host plant, the naked-stem buckwheat, more of a fighting chance against invasive vetch species and other enemies.

"We've got a lot of invasive species, but vetch is the biggest problem because it totally smothers buckwheat," says refuge wildlife specialist Louis Terrazas. "It also endangers our other two endangered plants," the Contra Costa wallflower (*Erysimum capitatum* var. *angustatum*) and Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*).

Working with the California Conservation Corps, high school students, and volunteers, refuge staff pull vetch plants, and then cut them with

weed trimmers. "It's really labor intensive," says Terrazas. "Plus, it's difficult because you have the two endangered plants plus buckwheat out there, which could have butterflies on it. So you've got to be careful where you step, where you set equipment, be careful not to pull the wrong thing." Using herbicides would be problematic. "If we spray, there might be drift that kills endangered plants or butterflies," says Terrazas. "It's a predicament."

Wanted: More Sand

This past fall and winter, staff and volunteers trimmed non-native grasses and planted more than 6,000 buckwheat seedlings. It's all part of an effort to restore a dune ecology more hospitable to buckwheat.

The challenges are formidable, says Euing. "Most of the sand has been mined away to make brick since 1850s," she says. "We're down to hardpan," which favors invasives. Native plants prefer big wind-blown dunes that move and are easily disturbed.

In a land-clearing experiment with the University of California-Davis, the refuge last year set aside two five-acre (two-hectare) plots for grazing by 14

head of cattle. "There are lots of native seeds out there," says Euing. "They just have trouble competing with grasses and invasives. So if we could take off the top layer of invasives by grazing, it may allow native plants to come up on their own."

The refuge has also had some success managing for fire. Wildfires over the last decade have destroyed acres of butterfly habitat, but there's been no fire on the refuge for almost three years.

The metalmark's future is uncertain, but Terrazas prefers to look on the bright side. "The population has come back up – not in a spectacular fashion, but it's come back up a little bit in the last two years," he says. "It's going in the right direction. So we can take a little credit."

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Jana Johnson and her son Max join the Urban Wildlands Group staff in releasing 30 gravid female Lange's metalmark butterfly adults last August at Antioch Dunes National Wildlife Refuge.



Louis Terrazas/FWS