# Where Have All the Butterflies Gone?

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Cold, wet conditions early in the year mean that 2006 is shaping up as the worst year for California's butterflies in almost four decades, according to Art Shapiro, professor of evolution and ecology at UC Davis.

That's a turnaround from last spring, when millions of painted lady butterflies migrated through the Central Valley. But other species have seen steep declines in recent years and could disappear from the region altogether.

"It has been the worst spring for butterflies of my 35 in California," Shapiro said. "There will probably be long-term repercussions, especially for species already in serious decline."

Shapiro said that at most of his study sites, he is seeing half or less than half the number of species present at this time in an average year, and far fewer individual butterflies than usual. For example, at Gates Canyon near Vacaville he counted 10 species and 43 individuals on April 18, 2006. At the same site on April 19, 2005, he counted 21 species and 378 butterflies.

This winter's weather conditions may have a lot to do with the drop in numbers. The early winter was mild, with not enough cold to end the winter dormancy or "diapause" of most butterflies, so they did not emerge to take advantage of early warm weather in February. Then March turned cold and wet, wiping out the breeding of species that had emerged.

While northern California was soaked, the southwest desert has had a very dry "La Nina" winter, leaving little food for the caterpillars of the painted lady. Shapiro said that, as in previous dry winters, the painted lady butterflies had given up on trying to breed in the desert and headed north; a handful were seen in Davis on Feb. 11. Shapiro and his students have seen only one painted lady in the area in recent weeks, when the migration would normally occur.

Apart from this year's weather, several species of California butterflies, including the large marble, sooty wing, Lorquin's admiral and the mourning cloak, suffered major declines in 1999 and have not yet recovered, Shapiro said.

Shapiro compared the decline of the butterflies to similar declines in populations of frogs and other amphibians. While there may be different possible explanations for declines at each location, "the pattern is regional," he said. Shapiro is working to test various ideas about why these butterflies are in decline, including combinations of changing climate and changing land use.

In the short term, he said, butterfly species that breed several times a year may rebound quickly to take advantage of improving conditions. But for species with only one brood per year, a catastrophic season will have repercussions for up to a decade.

More butterflies may still emerge in the mountains. The rain has led to a heavy snow pack in the Sierra Nevada, which typically means a good year for butterflies in the high country. Snow protects the dormant insects from cold and drying. But the snow came late in the season, meaning that many of the overwintering insects may have been killed off early. We will not know about the fate of those butterflies until July, Shapiro said.

Source: UC Davis