

## Western Ecological Research Center

# Publication Brief for Resource Managers

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## Effects of Dust Deposition on Lane Mountain Milkvetch

The endangered Lane Mountain milkvetch (*Astragalus jaegerianus*) has a limited distribution in southern California's Mojave Desert with populations located on lands administered by US Department of Army's National Training Center (NTC) and Bureau of Land Management (BLM). While concerns exist regarding the impact of increased human activity on direct plant



Lane Mountain milkvetch plants characteristically use Mojave Desert shrubs as a trellis for support. White tags mark the stems that were measured after plants were experimentally dusted to simulate dust generated by surface soil disturbance. Photo: L. DeFalco, USGS.

### Management Implications:

- Even though loss of habitat is the greatest threat for Lane Mountain milkvetch, minimizing the proliferation of vehicle routes adjacent to milkvetch populations can protect plants from indirect effects of airborne dust deposition, especially during periods of low rainfall.
- The effectiveness of management actions such as fencing milkvetch populations and developing buffer zones between high-use areas and conservation areas can be assessed by monitoring dust deposition in combination with measurements of plant vigor.

injury and habitat loss, airborne dust generated by soil surface disturbances presents a potential threat to populations, even if measures such as fencing conservation areas are implemented. In a study in the journal *Madroño*, USGS scientists examined the effects of airborne dust deposition on milkvetch physiology and growth to determine whether dust accumulation could decrease the vigor of milkvetch plants.

Through field and greenhouse studies, authors Upekala Wijayratne, Sara Scoles-Sciulla and Dr. Lesley DeFalco experimentally dusted milkvetch plants and measured several indicators of plant vigor: photosynthesis, water stress, and growth through the growing season. Ambient levels of dust deposition associated with single- and dual-track dirt routes near milkvetch plants were also monitored to determine if dust levels generated during seasonal recreational use pose a threat to the population on BLM land.



Flower and fruit production was low during the study irrespective of whether plants were dusted; thus it remains to be seen whether reproduction over the lifetime of milkvetch plants is compromised by diminished growth. Photo: L. DeFalco, USGS.

Experimental dusting did not affect plant water stress but raised photosynthetic rates by elevating leaf temperatures, which would extend the number of days that milkvetch could maintain photosynthesis during early spring. However, as experimental dust accumulated on leaves and spring and summer temperatures increased, overall growth of milkvetch declined, indicating that favorable leaf temperatures for photosynthesis were exceeded. Ambient dust deposition near dirt trails ranged from 0.04 – 0.17 g/m<sup>2</sup>/d, which was well below the lowest level of dust on experimental plants (3.95 g/m<sup>2</sup>/d). While heavy dust accumulation can have negative effects on plant growth, the low level of ambient dust deposition due to recreational vehicle use did not pose a hazard to milkvetch plants during this study.

*Wijayratne, U. C., S. J. Scoles-Sciulla, and L. A. DeFalco. 2009. Dust deposition effects on growth and physiology of the endangered Astragalus jaegerianus (Fabaceae). Madroño 56:81–88.*