

Western Ecological Research Center

Publication Brief for Resource Managers

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Effects of Livestock Watering Sites on Alien and Native Plants in the Mojave Desert

Artificial watering sites can have significant ecological effects in arid and semi-arid desert ecosystems where standing surface water is uncommon. One major effect is the focused grazing and activity patterns of large herbivores around artificial watering sites. This focused activity results in a disturbance gradient called a “piosphere.” USGS scientists Drs. Matt Brooks and Kristin Berry, and J. R. Matchett studied responses of alien and native annual plants and native perennial plants within 9 piospheres in the Mojave Desert. Their study is published in a recent issue of the *Journal of Arid Environments*.

The authors conducted their study in the Pilot Knob grazing allotment in the west-central Mojave Desert, California. They found that absolute and proportional cover of alien annual plants increased with proximity to watering sites, whereas cover and species richness of native annual plants decreased. Not all alien species responded the same, as the alien forb *Erodium cicutarium* and the alien grass *Schismus* spp. increased with



Typical watering site in the Mojave Desert. Photo: J. R. Matchett, USGS.

Management Implications:

- Alien species that are already present at watering sites should be prioritized for control based on their potential to spread beyond the watering sites and become significant management problems.
- Control of alien annual plants, and restoration of native annuals, should focus primarily on the area 200 m from watering sites at the Pilot Knob grazing allotment. Special attention should be devoted to the interspace microhabitat, where the negative piosphere effects were strongest.
- Restoration of native perennial plant cover, species richness, and structural diversity should focus primarily on the area 50 m closest to the watering sites; small shrub species should be primarily used to restore plant structural diversity.

proximity to watering sites, and the alien annual grass *Bromus madritensis* spp *rubens* decreased. Perennial plant cover and species richness declined with proximity to watering sites, as did the structural diversity of perennial plant cover classes. Significant effects were focused within 200 m of the watering sites, suggesting that control efforts for alien annual plants and restoration efforts for native plants should optimally be focused within the central part of the piosphere gradient.

Brooks, M. L., J. R. Matchett, and K. H. Berry. 2006. Effects of livestock watering sites on alien and native plants in the Mojave Desert, USA. *Journal of Arid Environments* 67:125–147.