

Spring 2008

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Repository Citation

Abella, S. R., Engel, E. C. (2008). Plant community response to fire: A chronosequence study. *Mojave Applied Ecology Notes*, 1(1),
https://digitalscholarship.unlv.edu/sea_fac_articles/381

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Plant Community Response to Fire: A Chronosequence Study

Cayenne Engel and Scott Abella

Fires are becoming more prevalent events across the landscape in the southwestern US. Over the next several decades the already arid southwest is predicted to become warmer and drier, with longer summers, and an increase of “extreme” weather events such as lightning inducing thunderstorms. While the “hotter and drier” forecast may indicate less abundant plant life, and thus less available biomass for fuel, exotic invasive plant species are becoming more dominant across the landscape with increases in human travel and commerce. Exotic species (particularly many of the invasive grasses) are adding fuel for the fires to burn when the annuals are left as skeletons at the end of summer.

With increases in fire frequency, land managers want to know what to expect of the visual and functional response of the plant communities in their systems. Like much of the ecology of Mojave ecosystems, little is known about the community level response to fire, such as recovery time and the factors affecting the rate of recovery.



A 2005 burn at Gold Butte. The road acted as a fire break.

Therefore, we are collecting data from a chronosequence of fires that have occurred in southern Nevada Mojave ecosystems over the last 30 years (along with adjacent unburned sites). We will be looking at recovery rates and trajectories in plant community composition across the various fires. Additionally, there may not be a single direct successional path between post-fire regeneration and a recovered climax system. Sampling a variety of fire locations and ages should elucidate general patterns. We have sampled 13 fires to date, and expect to add 17 more. By combining biotic (such as initial vegetation) and abiotic variables (such as soil chemistry) from each site we will explain the response and direction of the plant communities post-fire, and provide managers with a predictive framework.

Recent Publications

- Abella, S.R., A.C. Newton and D.N. Bangle. 2007. Plant succession in the eastern Mojave Desert: An example from Lake Mead National Recreation Area, southern Nevada. *Crossosoma* 33(2R):45-55.
- Belnap, J., S.L. Phillips and S.D. Smith. 2007. Dynamics of cover, UV-protective pigments, and quantum yield in biological soil crust communities of an undisturbed Mojave Desert shrubland. *Flora* 202 (8):674-686.
- Deacon, J.E., A.E. Williams, C.D. Williams and J.E. Williams. Fueling population growth in Las Vegas: How large-scale groundwater withdrawal could burn regional biodiversity. *Bioscience* 57(8):688-698.
- Kristan, W.B. and W.I. Boarman. 2007. Effects of anthropogenic developments on common raven nesting biology in the west Mojave desert. *Ecological Applications* 17(6):1703-1713.
- A new website by the NRCS provides interactive keys for grass identification by state. Accessible at: http://npdc.usda.gov/technical/plantid_wetland_mono.html