Emmons_GEOG640
3/20/19
Class notes synthesis

Temporal Changes in native-exotic richness correlations during early post-fire succession
By Ginfeng Guo

This article investigates the dynamic relationship between native and exotic species in a California coastal sage scrub (CSS) ecosystem. The emphasis on temporal changes is used to challenge the paradigm that exotic vegetation is the dominant driver for biodiversity loss and highlights species inclusivity within the process of ecological succession.

Documenting cover and richness immediately following fire disturbance can illuminate qualities and behaviors that individual species exude during varying levels of resource availability. Figure 1 demonstrates an increase and stabilization of biomass and exotic-native species diversity trends over time. The reason for spikes of species richness can be attributed to the immediate availability of resources and decline as competition increases. Although individual exotic species maintain different relationships to natives and disturbance regimes, the model highlights a general habit of pioneer species that transition to CSS dominated system.

Guo alludes to resource flows, and Syphard more fully explores importance of post-fire precipitation patterns to CSS regeneration. Syphard's map shows the majority of mixed CSS sites remain closer to the coast, while inland were higher clusters of annual exotic type conversion. The CSS recovery is variable and subtle differences between coastal and inland, slope and aspect will likely lead to different successional trajectories. Guo's case study site had direct spatial connectivity to open space seed sources and positioning to the coast were likely crucial factors in the return of native biodiversity to the site.

Gaps identified within the article relate to belowground processes and patterns. This can be tied to soil moisture holding capacity, significant fungal relationships to CSS, and role of burrowing mammals in soil development. However, Guo does not explore the risk of feedback loops, fragmentation, and effects of climate change, which may alter the timescale and real life successional outcomes. As Guo's case study uses secondary data of species abundance from a UC study area in the Santa Monica Mountains from 1994-1997, there is a current opportunity for monitoring and assessment of this site 16 years later.

Implications for management may be something other than invasive control, and more related to manipulations of water, burn, and habitat connectivity. Superficial observations of type conversion encourage blame of exotic species without understanding individual context for what creates invasive tendencies. Improve effectiveness in biodiversity management by understanding below-the-surface causes for above ground species compositions can help land managers act as better facilitators of successional processes, and encourage using the right tool at the right time for the more effective stewardship of biodiversity.